



## SIERRA COUNTY GENERAL PLAN

### BACKGROUND DOCUMENT VOLUME II

JULY, 1996

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**WATER  
RESOURCES  
ELEMENT**



**GENERAL PLAN  
2012**









JULY, 1996

## 8. Water Resources Element

### Background Report

#### Issues

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The following issues were raised at the public General Plan Issues Workshops or at other points during the General Plan process by consultants, staff or Planning Commissioners. While each of these issues may not have resulted in the development of a related policy (as a result of Planning Commission discussion) the list is included here as a record of the full range of concerns discussed.



**Table 8-1**  
**SIERRA COUNTY GENERAL PLAN**  
**WATER RESOURCES ISSUES**

**General Plan Issues Workshops**

<b>Economic Potential</b>	<b>Development</b>	<p>The County's water is a resource which may be a possible area of development. As a possible new use, bottled water should be looked at.</p> <p>The County should explore recreational uses of water as a growing industry in the future.</p>
<b>Exportation of Water</b>		<p>The County's water resources should be conserved for agricultural use and should not be sold to Nevada.</p> <p>Keeping the water resources in the County is a priority.</p> <p>Unappropriated water is a problem.</p>
<b>Water Supply</b>		<p>If the County is to grow, commercial and domestic water demand will grow.</p> <p>There is a shortage of water in eastern Sierra County.</p> <p>Viable water use criteria needs to be defined.</p> <p>Recognition of ground water districts is important in planning.</p> <p>Amount and quality of water available should be determined by watershed management policies.</p>
<b>Growth Inducement</b>		<p>Use of lake water for domestic purposes could be a growth-inducing problem.</p>
<b>Geothermal Use</b>		<p>Geothermal potential of Sierra County should be explored.</p> <p>The impacts of geothermal use need to be defined.</p>
<b>Water Quality</b>		<p>The potential for hazardous material spills in our waterways needs to be addressed. There is a provision for this in the hazardous waste element. Sierraville is a designated truck stop</p> <p>Water quality degradation from landfills.</p> <p>Water quality degradation from underground storage tanks (USFS).</p>

(Continued . . .)



<b>Nuclear</b>	We should look into Nevada County's nuclear materials commission that requires notification of hazardous materials transport.
<b>Cloud seeding</b>	Cloud seeding is an issue in Sierra County.  Concern about the potential for cloud seeding to increase snow removal costs.
<b>General Plan Guidelines.</b>	Water and its hydraulic force, rivers, and other waters are the water-related mandatory issues identified by the Guidelines. Optional water-related issues include the following (p. 118)
	The reclamation of land and waters.
	The prevention and control of the pollution of streams and other waters.
	Regulation of the use of land in stream channels and other areas required for the accomplishment of the conservation plan.
	Prevention, control, and correction of the erosion of soils, beaches, and shores.
	Protection of watersheds and flood control

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## Background Discussion

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### Introduction

The general climate and geology are described in this section, followed by a more detailed description of the surface water resources, surface water rights, groundwater resources, and water use of Sierra County. Information presented in this Background section was collected from existing reports of the California Department of Water Resources (DWR), the California State Water Resources Control Board (SWRCB), the United States Geological Survey (USGS), augmented by an assortment of public documents available from Sierra County.

### Climate

The climate of Sierra County is mountainous, with temperature extremes ranging from below zero to above 100 degrees (DWR, 1960). Average annual precipitation varies from greater than 70 inches in the lower elevations of the western part of the County to less than 15 inches in the high elevation basin



in the eastern part of the County. There is a significant variation in rainfall across Sierra Valley in the eastern part of the County, with an average of more than 40 inches per year on the west dropping to less than 12 inches per year on the east (DWR, 1983). Average annual evaporation is about 41 inches at Downieville and 39 inches at Sierraville.

## **Geology**

The general surface geology of Sierra County has been mapped by the DWR (1960) as shown in Figure 8-1. This mapping shows that the County is covered predominantly by rocks of the basement complex, with large areas of undifferentiated tertiary and quaternary volcanic rocks concentrated in the eastern part of the County. In general, neither of these formations are water-bearing, although deposits of volcanic rocks in Sierra Valley have been found to be highly water-bearing in some locations. Alluvium and terrace deposits are mapped in the Sierra Valley, Upper Long Valley, along the Little Truckee River, and in other small valleys found at higher elevations. Two areas of undifferentiated Pliocene and Pleistocene non-marine Sediments are mapped, one in the northeastern corner of the County just west of Peavine, and the other in the northwestern corner of the County near Union Hill (UC, 1987).

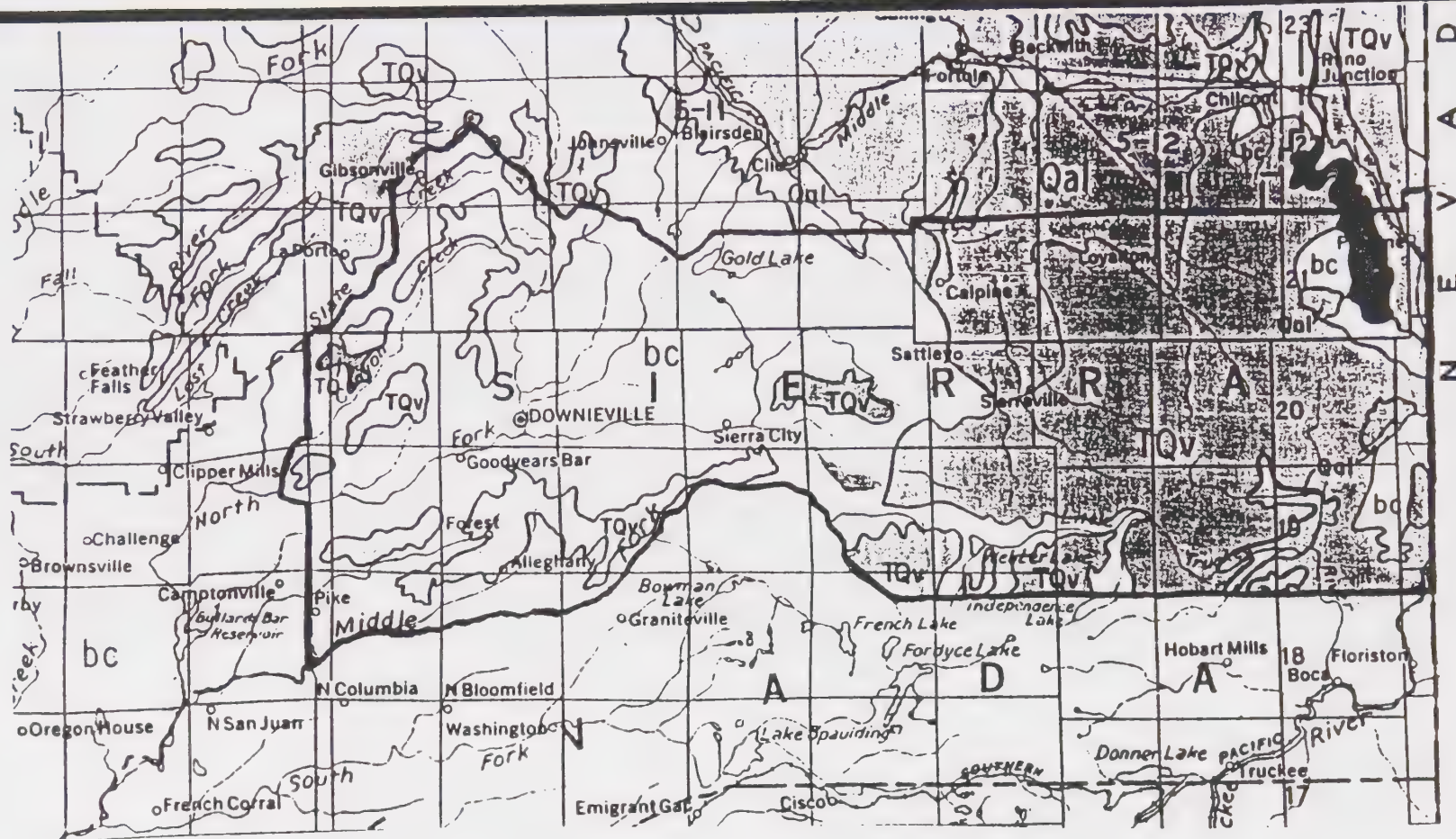
The DWR (1963) describes the geology of Sierra Valley as one of widespread volcanism. Up until the Pliocene epoch the Valley was the site of volcanic outpourings of andesite, ash, tuff breccia, and basalt. Associated with the volcanic activity was a period of extensive faulting which formed Sierra Valley. After the formation of the Valley it became a lake, draining east into the Middle Fork of the Feather River. The lake received sediments from the surrounding mountains and outwash from melting glaciers. The outlet to the Middle Feather River was slowly eroded downward until the lake was completely drained, leaving the present valley.

## **Surface Water Features**

Surface water features in Sierra County are numerous. On a statewide level the surface water features of the County can be divided into a primarily western part that drains into the Central Valley Drainage Basin, and an exclusively eastern part that drains into the Lahontan Drainage Basin. In



8-5



# LEGEND



RECENT AND SOME OLDER ALLUVIUM, ALLUVIAL FANS AND TERRACE DEPOSITS. LARGELY FLUVIAL BUT INCLUDES PLAYA LAKE DEPOSITS, MARSH DEPOSITS, PLEISTOCENE LAKE BEDS, AND GLACIAL MORAINES AND DRIFT. CONSISTS OF GRAVEL, SAND, (SOME TUFFACEOUS), SILT, CLAY, AND LACUSTRINE MARL, AND CLAY. THE AREAS OF Qal ARE IN GENERAL GROUND WATER BASINS. IN MODOC, SISKIYOU AND LASSEN COUNTIES THE GROUND WATER BASINS INCLUDE SOME RECENT WATER-BEARING VOLCANICS.



UNDIFFERENTIATED PLIOCENE AND SOME PLEISTOCENE NON-MARINE SEDIMENTS OF VARIABLE LITHOLOGY. INCLUDES CACHE, TENAMA AND TUSCAN FORMATIONS. WATER-BEARING IN PART.



UNDIFFERENTIATED OLDER TERTIARY (MOSTLY EOCENE OR PALEOCENE), MARINE AND NON-MARINE SEDIMENTS OF VARIABLE LITHOLOGY. INCLUDES THE HOME MONTGOMERY CREEK, WEAVERVILLE, CAPAY, AND MARYSVILLE FORMATIONS, BUTTE GRAVELS, AURIFEROUS AND AMESITIC GRAVELS, AND HAY FORK BEDS. GENERALLY NONWATER-BEARING.



UNDIFFERENTIATED TERTIARY AND QUATERNARY VOLCANIC ROCKS. MOSTLY NONWATER-BEARING, BUT SOME BASALT FLOWS ARE VERY HIGHLY WATER-BEARING.



UNDIFFERENTIATED JURASSIC AND CRETACEOUS SEDIMENTARY, VOLCANIC, METASEDIMENTARY, AND META VOLCANIC ROCKS. INCLUDES THE KNOXVILLE AND FOREMAN FORMATIONS, SHASTA SERIES AND THE FRANCISCAN GROUP. GENERALLY NONWATER-BEARING, BUT LOCALLY CONTAIN CONNATE WATER.



BASEMENT COMPLEX. INCLUDES METAMORPHIC AND INTRUSIVE IGNEOUS ROCKS. CRETACEOUS AND OLDER. GENERALLY NONWATER-BEARING.

SOURCE: DWR, 1960

# ASE

APPLIED SCIENCE AND ENGINEERING INC.

SCALE OF MILES



FIGURE 8-1  
GENERALIZED GEOLOGIC MAP OF  
SIERRA COUNTY



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general, surface water in the Central Valley Drainage Basin drains to the west, into the Sacramento River in the Central Valley of California, while the surface water in the Lahontan Drainage Basin drain towards the north and east into either the Honey Lake or Pyramid Lake sinks. On a areal basis it is estimated that approximately four-fifths of the County is in the Central Valley Drainage Basin while the remaining one-fifth is in the Lahontan Drainage Basin.

These major basins are further divided into hydrographic units by the DWR (1960) on the basis of water supply, natural drainage divides, and the location of convenient stream gaging stations Figure 8-2. The Central Valley Drainage Basin in Sierra County includes portions of the North Yuba, Middle Yuba, Sierra Valley, and Middle Fork Feather River hydrographic units. The Lahontan Drainage Basin in Sierra County includes portions of the Herlong and Little Truckee River hydrographic units. All of these DWR hydrographic units extend beyond the boundaries of Sierra County. Only the portions of the hydrographic units which are within the County are discussed in this report.

For the purposes of this report the DWR hydrographic units are further subdivided into watersheds based primarily on topography. Watersheds were defined to allow a more detailed discussion of water resources in the County beneath the level of detail of the DWR hydrographic units, when possible, and should not be construed as fixed boundaries.

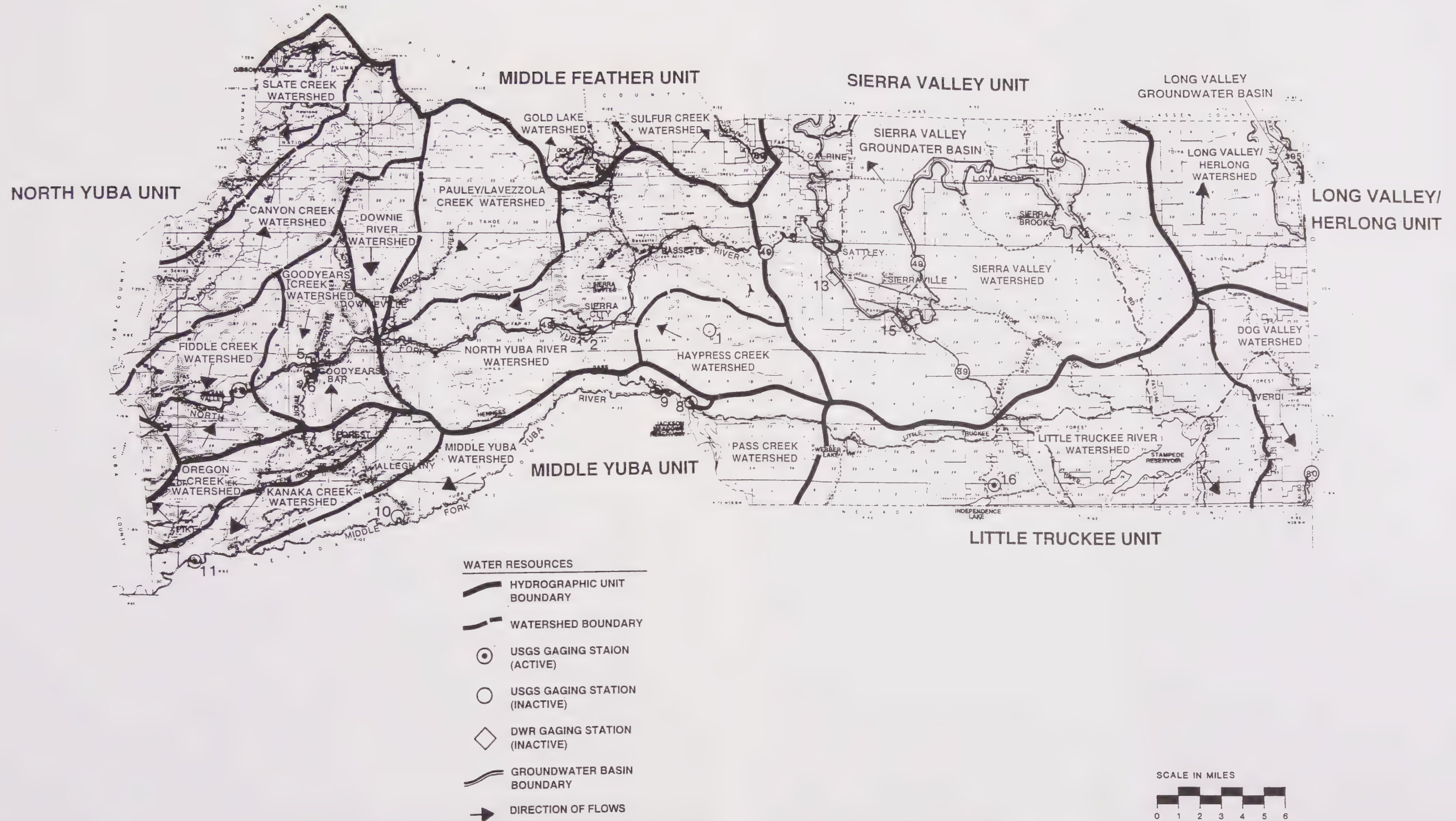
**CENTRAL VALLEY DRAINAGE BASIN:**  
***North Yuba River Hydrographic Unit***

**PHYSICAL SETTING—** The majority of Sierra County lies within the North Yuba River Hydrographic Unit (North Yuba Unit). This hydrographic unit encompasses an area in Sierra County that is roughly described as north of a line formed by Henness Pass Road and Bald Ridge, east of Yuba County, south Plumas County, and west of the Sierra crest excluding the vicinity around Gold Lake and Sulphur Creek. The major surface water feature in this unit is the North Yuba River, which flows from east to west across the County with a slight southward inclination. The vast majority of the North Yuba Unit, and therefore the source of the majority of its runoff, is in Sierra County.



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SIERRA COUNTY  
CALIFORNIA

FIGURE 8-2  
WATERSHEDS OF SIERRA COUNTY







The North Yuba Unit was sub-divided into watersheds for the purposes of this report Figure 8-2. The North Yuba Unit is comprised of the North Yuba River, Haypress Creek, Pauley and Lavezzola Creeks, Downie River, Goodyears Creek, Little Fiddle Creek, Canyon Creek, and Slate Creek watersheds.

- ***North Yuba River Watershed*** — The North Yuba River has its headwaters in Sierra County near Yuba Pass at the crest of the Sierra Nevada, flows from east to west across the center of the County with a slight southward inclination. Immediately below its headwaters the North Yuba is joined by Lunch and Dorsey Creeks. Next the North Yuba River is joined by the spring fed Lincoln Creek from the south, followed by Chapman, Haskell, and Howard Creeks. At Bassetts, Williams and Deer Creeks flow into the North Yuba River. A little below Bassetts the North Yuba River is joined by Salmon Creek which drains a number of lakes to the north including the Salmon Lakes, Deer Lake, Packer Lake and the Sardine Lakes. A number of small streams flow into the North Yuba River below Sierra City, primarily from the south, with many unnamed on the USGS quadrangle. The North Yuba River watershed defined for this report ends at Downieville.
- ***Haypress Creek Watershed*** — Just east of Sierra City the North Yuba River is joined by drainage from the Haypress Creek watershed. The Haypress Creek watershed drains a large area to the south and east of Sierra City including Haypress Valley. A USGS stream gaging station on Haypress Creek below Dead Horse Canyon has, in the past, been used to measure streamflow, but it is presently inactive (Figure 8-2). In addition, the USGS had a stream gaging station on the North Yuba River below its confluence with Haypress Creek and below Sierra City in the North Yuba watershed, but this station is inactive at the present time (Figure 8-2). The Tahoe National Forest Land and Resource Management Plan notes significant concern over cumulative watershed effects in prescribing water and soil resource improvement practices (Hennes Management Area, pp. V-149-V150).
- ***Downie River, Pauley and Lavezzola Creeks Watersheds*** — The next major tributary to the North Yuba River is Downie River which enters from the north at Downieville. Just upstream of its confluence with the North Yuba the Downie River watershed merges with waters draining from the Pauley and Lavezzola



Creeks watershed. These two creeks drain a relatively large area that extends to the northeast from Downieville to the County line. The water supply for Downieville is from Pauley Creek. An inactive USGS gaging station was located on the Downie River (referred to as the North Fork of the North Yuba River in the USGS reports) just above its confluence with the North Yuba River (Figure 8-2).

- ***Goodyears Creek Watershed*** — Below Downieville the major North Yuba River tributaries are Goodyears Creek from the north and Rock Creek from the south which join at Goodyears Bar. Stream gages previously maintained at this junction by the USGS on all three watercourses are now inactive (Figure 8-2). Below Ramshorn Camp at the western boundary of the Goodyears Creek watershed, the North Yuba is joined by St Catherine Creek. Immediately below this tributary is an active USGS gaging station for measuring stream flow.
- ***Little Fiddle Creek Watershed*** — Below St. Catherine Creek the North Yuba is joined by drainage from Little Fiddle Creek watershed. Little Fiddle Creek flows from the north into the North Yuba River, with Little Humbug Creek joining from the south. Then, the North Yuba River flows through Indian Valley to Shenanigan Flat where it is joined by Indian Creek. At Cut Eye Fosters Bar the North Yuba defines the County line for a short distance, is joined by Canyon Creek from the north at Kellys Bar and then departs the County. Eventually the North Yuba River flows into the 961,300 acre-feet New Bullards Bar Reservoir which is used for storage of water for use by the Yuba County Water Agency (YCWA).
- ***Canyon Creek Watershed*** — To the north of Little Fiddle Creek watershed, but still in Sierra County, is Canyon Creek watershed, encompassing all of the Sierra County lands drained by Canyon Creek. Canyon Creek originates near the northern County line at Beartrap Mountain flowing to the southwest prior to merging with the North Yuba River at Kelly Bar. The water and soils resources practices of the Tahoe National Forest Land and Resource Management (Canyon Management area) are intended to "Emphasize wildlife and watershed values when managing resources in streamside management zones . . ." (p. V-99)



- ***Slate Creek Watershed*** — Farther to the north, above the Canyon Creek watershed, is the Slate Creek watershed. Slate Creek drains the most northwestern portion of the County, originating along the northern County boundary delineated by Gibsonville and Bunker Hill Ridges, and flowing to the southwest in the general direction of the North Yuba River. Near Yankee Hill, Slate Creek becomes the boundary of Sierra County. At American House Ravine, below Poverty Hill, Slate Creek departs the County, eventually flowing into the North Yuba River at Race Track Point. At Feney Ravine, in Plumas County, water is diverted from Slate Creek through the Slate Creek Tunnel into the South Fork of the Feather River Hydrographic Unit for power development.

**DRAINAGE AREAS AND AVERAGE FLOWS** — The available data on drainage areas and average flows of watercourses in the North Yuba Unit are presented in Table 8-2, along with references for the information cited. Although the flow data is useful in conveying a general understanding of the surface water quantities, caution should be used in comparing flows because of the differences in the dates of the information. Approximate locations of the gaging stations cited are shown on Figure 8-2. A USGS schematic of the North Yuba River surface water system is presented in Figure 8-3.

Haypress Creek, a tributary to the North Yuba River located in the Haypress Creek watershed along the eastern edge of the North Yuba Unit, has a drainage area of approximately 18.2 square miles (sq. mi.) above the inactive stream gaging station located at Dead Horse Canyon. Records for this gaging station show that Haypress Creek has an average flow of 29,030 acre feet per year (af/yr).

The drainage area of the North Yuba River below Sierra City is estimated at 91.3 sq. mi., with an average flow of 166,500 af/yr. This includes the drainage area and flows cited above for Haypress Creek.

Further downstream, near Downieville, the North Yuba River is joined by the Downie River. Records from an inactive USGS gaging station at this location



**Table 8-2**  
**DRAINAGE AREAS AND AVERAGE ANNUAL FLOWS**

Stream Gage ID No.	Location	Drainage Area (sq.mi.)	Average Annual Flow (af.yr.)	Reference
<b>CENTRAL VALLEY DRAINAGE</b>				
<b>North Yuba Unit</b>				
1	Haypress Creek	18.2	29,030	USGS, 1966
2	N. Yuba near Sierra City	91.3	166,500	USGS, 1944
3	Downie River at Downieville	71.2	—	USGS, 1926
4	N. Yuba at Goodyears Bar	214	—	USGS, 1931
5	Goodyears Creek	12.2	28,520	USGS, 1933
6	Rock Creek at Goodyears Bar	10.8	17,810	USGS, 1933
7	N. Yuba at St. Catherine	250	547,000	USGS, 1990
—	N. Yuba in Sierra County	376	—	Halaytn, 1969
—	N. Yuba below Bullards Bar	481	1,015,000	DWR, 1960
—	N. Yuba below New Bullards	490	166,600	USGS, 1990
—	N. Yuba entire drainage area	571	1,130,000	DWR, 1960
—	Slate Creek diversion	—	68,470	USGS, 1990
—	Slate Creek below diversion	49.4	150,000	USGS, 1990
<b>Middle Yuba Unit</b>				
8	M. Yuba at Jackson Meadows	37.6	—	USGS, 1990
—	Milton-Bowman diversion	—	53,760	USGS, 1990
9	M. Yuba at Milton	39.8	77,460	USGS, 1965
10	M. Yuba near Alleghany	96.6	141,900	USGS, 1965
11	M. Yuba below Our House	145	97,810	USGS, 1990
	Dam	170	291,600	DWR, 1960
—	M. Yuba above Oregon Creek	108	—	Halaytn, 1969
—	M. Yuba in Sierra County	23	49,050	USGS, 1990
—	Oregon Creek at Camptonville			
<b>Sierra Valley Unit</b>				
12	L. Truckee Ditch at summit	—	7,039	DWR, 1973
13	Miller Creek	7.6	8,247	DWR, 1973
14	Smithneck Creek	31.6	8,076	DWR, 1973
15	Bonta Creek	37	28,224	DWR, 1973
—	S. Valley in Sierra County	268	—	Halatyn, 1969
—	S. Valley entire drainage	526	130,000	DWR, 1973
<b>Middle Feather Unit</b>				
—	M Feather in Sierra County	17	—	—
—	M. Feather entire drainage	672	980,000	DWR, 1960

Note: Stream Gage ID No. refers to gaging station location on Figure 8-2.



Stream Gage ID No.	Location	Drainage Area (sq.mi.)	Average Annual Flow (af.yr.)	Reference
<b>LAHONTAN DRAINAGE</b>				
<b>Little Truckee River Unit</b>				
—	Independence Lake	8	—	DWR, 1991
16	Independence Creek	8.1	18,760	USGS, 1990
—	Sagehen Creek	10.5	9,060	USGS, 1990
—	Stampede Reservoir	136	—	DWR, 1991
—	L. Truckee	146	136,200	USGS, 1990
—	L. Truckee in Sierra County	157	—	Halatyn, 1969
—	L. Truckee entire drainage	167	180,000	USGS, 1990
—	Dog Valley Watershed	30	—	—
<b>Long Valley Unit</b>				
—	Long V. Creek in Sierra County	50	—	Halatyn, 1969
—	Long V. Creek near Scotts	114	11,300	DWR, 1960
—	Long V. entire drainage	567	30,000	DWR, 1960

Note: Stream Gage ID No. refers to gaging station location on Figure 8-2.

SOURCE: Applied Science & Engineering, 1993, Table 1.

show that the drainage area above this point, incorporating both the Downie River and the Pauley/Lavezzola watersheds (Figure 8-2), is approximately 71.2 sq. mi., with no estimate of average annual flow available.

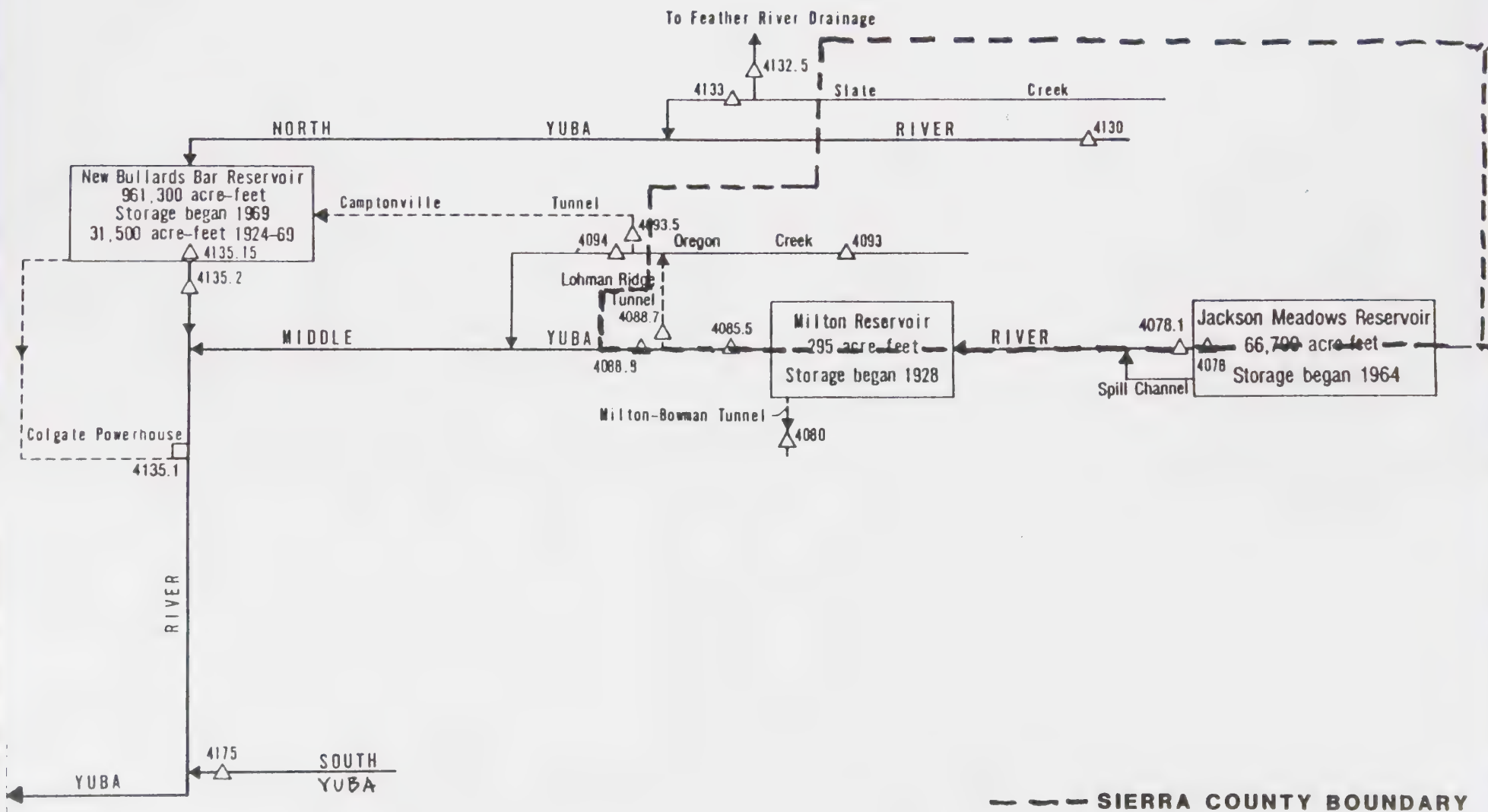
Records from the inactive USGS gaging station just above Goodyears Bar show that the North Yuba River drainage area has increased to about 214 sq. mi., with no estimate of average flow available. Below Goodyears Creek the North Yuba River is joined from the north by Goodyears Creek with a drainage area of 12.2 sq. mi. and an average flow of 28,520 af/yr, and Rock Creek from the south with a drainage area of 10.8 sq. mi. and an average flow of 17,810 af/yr. By adding the estimates cited above from records of comparable age, the entire drainage area of the North Yuba River at this point is 237 sq. mi., with no estimate of average flow calculable.

The drainage area of the North Yuba River above the next gaging station located at St. Catherine Creek at the lower edge of the Goodyears Creek watershed is estimated to be 250 sq. mi. with an average discharge of 547,000 af/yr. This is the last gaging station on the North Yuba River before it passes through Little Fiddle Creek watershed prior to its exit from the County near Kelly Bar.



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The drainage area of Slate Creek above the diversion dam at Feney Ravine in Yuba County is 49.4 sq. mi. (USGS, 1990). About half of this drainage area is estimated to be within Sierra County with the other half in Yuba and Plumas Counties. The average annual flow of Slate Creek below the tunnel diversion is 150,000 af/yr, with an average of 68,470 af/yr diverted through the Slate Creek Tunnel into the South Fork of the Feather River Hydrographic Unit. The entire flow in Slate Creek above the diversion calculated as the sum of these two records is 218,470 af/yr, with probably about half of this water originating in Sierra County.

Halatyn (1969) estimated that the drainage area of the North Yuba Unit in Sierra County is 376 sq. mi. Considering that the drainage area of the North Yuba River at New Bullards Bar below Sierra County is estimated at about 490 sq. mi., more than 75% of the New Bullards Bar drainage area is in Sierra County. The average flow of the North Yuba River below Bullards Bar Reservoir was estimated at 1,015,000 af/yr by the DWR (1960) and below New Bullards Bar Reservoir at 166,600 af/yr by the USGS (1990). Presumably, this difference in stream flow is attributable to the different record dates reflecting new diversions resulting from construction of New Bullards Bar Reservoir in 1969.

According to the DWR (1960) the entire drainage area of the North Yuba River drainage area is approximately 571 square miles, with an average annual runoff 1,130,000 acre-feet (af). This estimate includes areas and runoff that do not originate in Sierra County, as well as a portion of the Middle Yuba River Unit in Sierra County discussed in the following section.

#### **CENTRAL VALLEY DRAINAGE BASIN:**

##### **Middle Yuba River Hydrographic Unit**

**PHYSICAL SETTING** — The major surface water feature in the Middle Yuba River Hydrographic Unit (Middle Yuba Unit) is the Middle Yuba River, originating at the Sierra Crest near Meadow Lake in Nevada County, just south of the Sierra County boundary. The approximate boundaries of the Sierra County portion of the Middle Yuba Unit are Henness Pass Road on the north, the Sierra crest on the east, the Middle Yuba River on the south, and Yuba County on the west. The Middle Yuba River flows from east to west with a slight southward inclination, defining the southern county line, eventually departing from the County just southwest of the town of Pike. Below Sierra County the Middle Yuba River merges with the North Yuba River near North San Juan, below New Bullards Bar Reservoir. The Middle Yuba Unit was divided into the Pass Creek, Middle Yuba River, Kanaka Creek, and Oregon Creek watersheds.



- ***Pass Creek Watershed.*** The major tributary to the Middle Yuba River, draining Sierra County lands at higher elevation, is Pass Creek watershed. Pass Creek enters the Middle Yuba River at the 66,700 acre-foot storage Jackson Meadows Reservoir, a facility constructed and operated for storage by the Nevada Irrigation District (NID). According to the Tahoe National Forest Land and Resource Management Plan NID has plans to construct a hydroelectric plant on the dam at Jackson Meadows Reservoir sometime in the 1990's (p. V-181). An active USGS stream gaging station is located on the Middle Yuba River immediately below Jackson Meadows Reservoir.
- ***Middle Yuba River Watershed.*** Just downstream of Jackson Meadows Reservoir the Middle Yuba River watershed begins. A major surface water feature in this watershed is the 295 acre-foot storage Milton Reservoir, owned and operated by NID for the diversion of Middle Yuba River water into the Milton-Bowman Tunnel for transfers to Bowman Lake in Nevada County. Below Milton Reservoir on the Middle Yuba River is an active USGS stream gaging station.

Many miles below Milton Reservoir the Middle Yuba River is joined from the north by Bear Creek near the Von Humbolt Mine and Wolf Creek in Gold Canyon. An inactive USGS gaging station is located on the Middle Yuba River just below Wolf Creek southwest of Alleghany. According to the Tahoe National Forest Land and Resource Management Plan: "Wild and Scenic river values will be protected for the Middle Yuba River until such time as the suitability study is completed and new management emphasis developed. The River is potentially eligible for 'wild', 'scenic', or 'recreation' classification." (p. V-178). The Wild and Scenic River Act is discussed further in a subsequent section of this Element.

- ***Kanaka Creek Watershed.*** Further downstream, below Foote Crossing, is the Kanaka Creek watershed. Kanaka and Indian Creeks drain from the north into the Middle Yuba River in this watershed. Below Indian Creek on the Middle Yuba River is the Our House Dam, a YCWA facility that diverts water from the Middle Yuba River into the Lohman Ridge tunnel for transfer to Oregon Creek and the Camptonville Tunnel, eventually flowing into New Bullards Bar Reservoir. An active USGS gaging station



measures flow in the Middle Yuba River below Our House Dam, southwest of Pike.

The Middle Yuba River leaves Sierra County and the Kanaka Creek watershed about two miles south of the town of Our House, flowing to its confluence with Oregon Creek near Freemans Crossing beyond the County boundary. The DWR (1960) estimated the flow in the Middle Yuba River at a gaging station just above the junction of the Middle Yuba River and Oregon Creek. Below this point the Middle Yuba River joins the North Yuba River at Klensendorf Point, south of New Bullards Bar Reservoir.

- ***Oregon Creek Watershed.*** The Oregon Creek watershed drains a portion of Sierra County that is north of the Kanaka Creek watershed and south of Henness Pass Road. Oregon Creek flows from east to west with a slight southern inclination leaving Sierra County southeast of Camptonville near Alaska Hill. Log Cabin Dam, located below Camptonville on Oregon Creek in Yuba County is used by the YCWA to divert water into the Camptonville Tunnel, continuing the transfer of Middle Yuba River water that began at the Lohman Ridge Tunnel at Our House Dam. There is an active USGS gaging station on Oregon Creek above the Log Cabin Dam diversion near Camptonville. Oregon Creek eventually joins the Middle Yuba River at Freemans Crossing in Yuba County.

DRAINAGE AREAS AND AVERAGE FLOWS — The available data on drainage areas and average flows of watercourses in the North Yuba Unit are presented in Table 8-2 along with references for the information cited. Although the flow data is useful in conveying a general understanding of the surface water quantities, caution should be used in comparing flows because of the different dates of the records. Approximate locations of the gaging stations cited are shown on Figure 8-2. A USGS schematic of the Middle Yuba River surface water system is presented in Figure 8-3.

The drainage area of the Middle Yuba River above Jackson Meadows Reservoir is 37.6 sq. mi., including areas in both Sierra and Nevada Counties. At the Milton-Bowman tunnel an estimated 53,760 af/yr is diverted from the Middle Yuba River by NID into Nevada County (USGS, 1990). The drainage area of the Middle Yuba River above Milton Reservoir (Sierra and Nevada Counties) is 39.9 sq. mi., with an average flow of 77,460 af/yr calculated by the USGS (1965) from the sum of the flow measured at this station and the flow



measured at the Milton-Bowman outlet prior to 1964. The USGS (1965) gaging record for the Middle Yuba River below Milton notes that practically all the flow is diverted into the Milton-Bowman Tunnel after May 23, 1928. The more current USGS (1990) record notes that practically the entire flow of the Middle Yuba River is diverted into the tunnel during low and medium flows.

The data from the inactive USGS gaging station near Alleghany shows an average flow of 141,900 af/yr in the Middle Yuba River generated from a drainage area of 96.8 sq. mi. located in both Sierra and Nevada Counties.

At the Our House Dam, where water is diverted into the Lohman Ridge Tunnel, the drainage area of the Middle Yuba River has increased to 145 sq. mi. (Sierra and Nevada Counties) with an average flow of 97,810 af/yr (USGS, 1990). Below this gaging station the Middle Yuba River departs Sierra County.

The DWR (1960) estimated the drainage area of the Middle Yuba River (Sierra, Nevada, and Yuba Counties) above its confluence with Oregon Creek in Yuba County at 170 sq. mi., with an average annual flow of 291,600 af/yr (DWR, 1960). Presumably, the large difference between this flow estimate and the more recent records for the flow below Our House Dam is attributable to the initiation in diversions to Lohman Ridge Tunnel in about 1970 and the recent drought conditions in California.

Halatyn (1990) estimated that approximately 108 square miles of the Middle Yuba Unit were located in Sierra County, or approximately 75% of the entire drainage area above the Our House Dam and 63% of the entire drainage area above Oregon Creek.

Oregon Creek drains approximately 23 sq. mi. above the active USGS gaging station above the Log Cabin Dam, near Camptonville in Yuba County just below Sierra County, with an average flow of 49,050 af/yr (USGS, 1990). Almost all of this drainage area and flow are attributable to Sierra County lands. At Log Cabin Dam water is diverted from Oregon Creek by YCWA into the Camptonville Tunnel for delivery into New Bullards Bar Reservoir.

#### **CENTRAL VALLEY DRAINAGE BASIN: Sierra Valley Hydrographic Unit**

**PHYSICAL SETTING** — The Sierra Valley Hydrographic Unit (Sierra Valley Unit) is located in northeastern Sierra County. The approximate boundaries of the Sierra Valley Unit are Plumas County on the north, the Sierra crest on the west, a line passing through Babbitt and Sardine Peaks to Henness Pass on the south, and Mount Ina Coolbrith and the Bald Mountains to the east.



The Sierra Valley Unit drains the streams originating in the mountains surround Sierra Valley. These streams flow onto the valley floor, turning generally northward on the valley floor before coalescing into the Middle Fork of the Feather River near Beckwourth in Plumas County. Eventually, the Middle Fork of the Feather River flows to the west, out of the Sierra Valley, journeying down the mountains and into the Sacramento River in the Central Valley.

There are numerous streams draining the mountains ringing Sierra Valley, with many unnamed on the USGS quadrangle. The major named streams are Carman Creek, Turner Canyon, and Berry Creek on the west. Flowing into the valley from the south are Dark Canyon, Bonta Creek, Cold Stream, Lemon Canyon, Antelope Valley, Bear Valley, Smithneck Creek. Badenaugh and Dodge Canyons flow into Sierra Valley from the east and originate on the west side of Babbitt Peak. On the east side of the valley, where precipitation and therefore run-off is lower, only one unnamed stream appears to enter the valley. These streams meander across the valley, coalescing into channels as they flow northward, forming marshy lands in the valley according to the USGS quadrangle.

Cold Stream which enters the valley from the south is used for conveyance of water diverted from the Little Truckee River near Onion Valley in the southern portion of the Sierra Valley Unit. From the USGS quadrangle it appears that the diverted water is distributed around the valley floor in a network of man-made channels that extend from Sierraville to east of Calpine. The Tahoe National Forest Land and Resource Management Plan (1990) contains the following standards, guidelines, and management practices (summarized and paraphrased except where indicated by indentation or quotation marks):

#### **Standards, Guidelines, Management Practices**

**CARMAN MANAGEMENT AREA:** Revegetation and stabilization of closed roads, surfacing of open roads where they are eroding or causing watershed damage, water resource improvement practices, and soils resource improvement practices (V-78). The need for these measures is apparent in the following problem statement (V-77):

This management area (MA) is located northwest of Calpine and south of Beckwourth Peak. A history of resource abuse prior to Federal land acquisition, including overgrazing and destructive logging practices (circa 1920s), left Carman Creek a severely deteriorated watershed. Major stream channels are gullied; slopes, meadows, and channel banks are actively eroding; and wildlife/range forage and visual quality are correspondingly deteriorated. The lower Carman Valley and Folchi Meadow were used in the past by waterfowl for nesting habitat. Waterfowl habitat has been reduced over the last fifty years because the water table has been lowered by the downcutting of Carman Creek. Several existing roads are eroding and require



stabilization and drainage, obliteration, or relocation. Elevation varies from 5,000 feet in Lower Carman Valley to about 7,300 feet at Beckwourth Peak.

**CHAPMAN MANAGEMENT AREA:** Road surfacing revegetation, and stabilization as described above under Carman Management Area because: "There is a concern for maintaining of water quality in streams used for domestic purposes in the Haskell Creek and Carvin Creek summer home tracts as well as the Calpine area (p. V-107)."

**SMITHNECK MANAGEMENT AREA:** Restriction of off-highway vehicles to designated routes only in Bear and Jones Valleys in part for protection of watershed research (V-120). Also water resource improvement and soils resource improvement practices apply (V-120). The Plan also states: "Watershed restoration structures (check dams) have been constructed in Bear Valley and Lemon Canyon to treat gully erosion in meadows. This erosion was caused by past railroad logging practices (V-119)."

**HENNESS MANAGEMENT AREA:** Water and Soils Resource Improvement practices are applied throughout this large management area "because of the extensive timber harvest that has occurred on both private and National Forest System lands . . . (V-148)" and a consequent ". . . significant concern for cumulative watershed effects (V-148)."

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**DRAINAGE AREAS AND AVERAGE FLOWS** — The available data on drainage areas and average flows of watercourses in the Sierra County portion of the Sierra Valley Unit are presented in Table 8-2 along with references for the information cited. Approximate locations of the gaging stations cited are shown on Figure 8-2.

The average flow of water imported to Sierra Valley from the Little Truckee River through the Little Truckee Ditch and into Cold Stream is estimated at about 7,039 af/yr (DWR, 1973).

The DWR (1973) also estimated the drainage areas and flows in Miller Creek, Smithneck Creek, and Bonta Creek (Table 8-2), three principal streams which enter the valley from the south. The total average flow from these three creeks based on the sum of the DWR estimates is calculated to be 44,547 af/yr.

Halatyn (1973) estimated that the drainage area of the Sierra Valley in Sierra County is approximately 268 sq. mi. Considering that the entire drainage area of the Sierra Valley Unit is 526 sq. mi. (DWR, 1960), Sierra County accounts for approximately 50% of this total. The average runoff for the entire Sierra Valley is estimated at 130,000 af/yr (DWR, 1960).



#### **CENTRAL VALLEY DRAINAGE BASIN:**

##### **Middle Fork Feather River Hydrographic Unit**

**PHYSICAL SETTING** — The Middle Fork of the Feather River Hydrographic Unit (Middle Feather Unit) contains only a small portion of Sierra County lands around Gold Lake and Sulphur Creek in the north-central part of the county. These two watersheds drain to the north through Frazier and Sulphur Creeks into the Middle Fork of the Feather River near Clio in Plumas County. The Middle Fork of the Feather River flows to the west, eventually reaching the Sacramento River in the Central Valley.

Gold Lake, the major surface water feature in the Sierra County portion of this unit has a surface area of about 500 acres and a maximum depth of 85 feet (Planning Concepts Ref: Recreational lakes in Sierra County). A low rock/masonry dam regulate flows from Gold lake into Frazier Creek.

**DRAINAGE AREAS AND AVERAGE FLOWS** — The drainage area of the entire Middle Feather Unit is 672 square miles with an average runoff of 980,000 af/yr (DWR, 1960). Only a small portion of this drainage area is located in Sierra County; estimated at less than 8 sq. mi. in the Gold Lake watershed and approximately 17 sq. mi. in the Sulphur Creek watershed. This is equivalent to less than 1% of the total Middle Feather Unit drainage area.

#### **LAHONTAN DRAINAGE BASIN:**

##### **Little Truckee River Hydrographic Unit**

**PHYSICAL SETTING** — The Little Truckee River Hydrographic Unit (Little Truckee Unit) is located in southeastern Sierra County. The Sierra County portion of the Little Truckee Unit is bounded on the east by the California-Nevada state boundary, on the south by Nevada County, on the west by the Sierra crest, and on the north approximated by the Sierra Valley Unit. The Little Truckee Unit drains, in general, to the east and then to the south into the Truckee River system. A short reach of the Truckee River passes through the southeastern corner of Sierra County, leaving California as it flows to the Pyramid Lake sink in Nevada.

The Little Truckee Unit was divided into the Little Truckee and Dog Valley watersheds. These two watersheds are separated by the Bald Mountain and Verdi Ranges. The Little Truckee watershed is to the west, and the Dog Valley watershed to the east, of the Verdi Range.



- ***Little Truckee Watershed.*** The major surface water features in the Little Truckee watershed are the Little Truckee River and Stampede Reservoir. The Little Truckee River originates on the eastern side of the Sierra crest near Webber Lake, flowing eastward through Perazzo Meadows. At the eastern end of Perazzo Meadows the Sierra Valley Water Company Ditch diverts water from the Little Truckee River to the north into Cold Stream in Onion Valley for delivery to Sierra Valley. Below Perazzo Meadows, west of State Route 89, the Little Truckee River is joined by Independence Creek, which drains the 17,300 acre-foot storage Independence Lake located to the south straddling the Sierra and Nevada County boundary. A relatively low dam was constructed on Independence Lake by the Sierra Pacific Power Company for regulation of Independence Creek flows for municipal water supply to Reno and Sparks, Nevada.

Below Independence Creek the Little Truckee River flows into Stampede Reservoir, a 226,500 acre-foot storage reservoir operated by the United States Bureau of Reclamation (USBR) primarily for fishery flows to Pyramid Lake, as well as incidental use for recreation, flood control, and power generation. Flowing into Stampede Reservoir from the east, parallel to the Little Truckee River, is Sagehen Creek which drains part of Nevada County. Stampede Reservoir also receives run-off from Sierra County through Davies, Merrill, and Hoke Valley Creeks which enter from the north. Water leaving Stampede Reservoir flows in the Little Truckee River across the County line into Nevada County and Boca Reservoir prior to joining the Truckee River.

The Tahoe National Forest Land and Resource Management Plan cites significant concern over cumulative watershed effects in prescribing management practices in the Henness Management Area which includes the Little Truckee River watershed (page V-148). The forest practices for the Sardine-Worn Management Area have included restoration as, "Watershed restoration efforts have been made in several channels and meadows eroded by past logging practices. Locations include Canyon 4, Worn Mill, Hoke Valley, and Davies Canyon (p. V-163)."

- ***Dog Valley Watershed.*** The Dog Valley watershed is drained by Dog Creek. Dog Creek leaves Sierra County near Verdi, flowing into the Truckee River in Nevada. A short reach of the



Truckee River flows through the southeast corner of the Dog Valley watershed on its route toward Pyramid Lake in Nevada.

The Toiyabe National Forest Land and Resource Management Plan Management Direction for Dog Creek is to: "Maintain existing erosion control structures in Dog Creek (p. IV-75)."

**DRAINAGE AREAS AND AVERAGE FLOWS** — The available data on drainage areas and average flows of watercourses in the Little Truckee Unit are presented in Table 8-2 along with references for the information cited. Approximate locations of the gaging stations cited are shown on Figure 8-2. A USGS schematic of the Little Truckee River surface water system is presented in Figure 8-4.

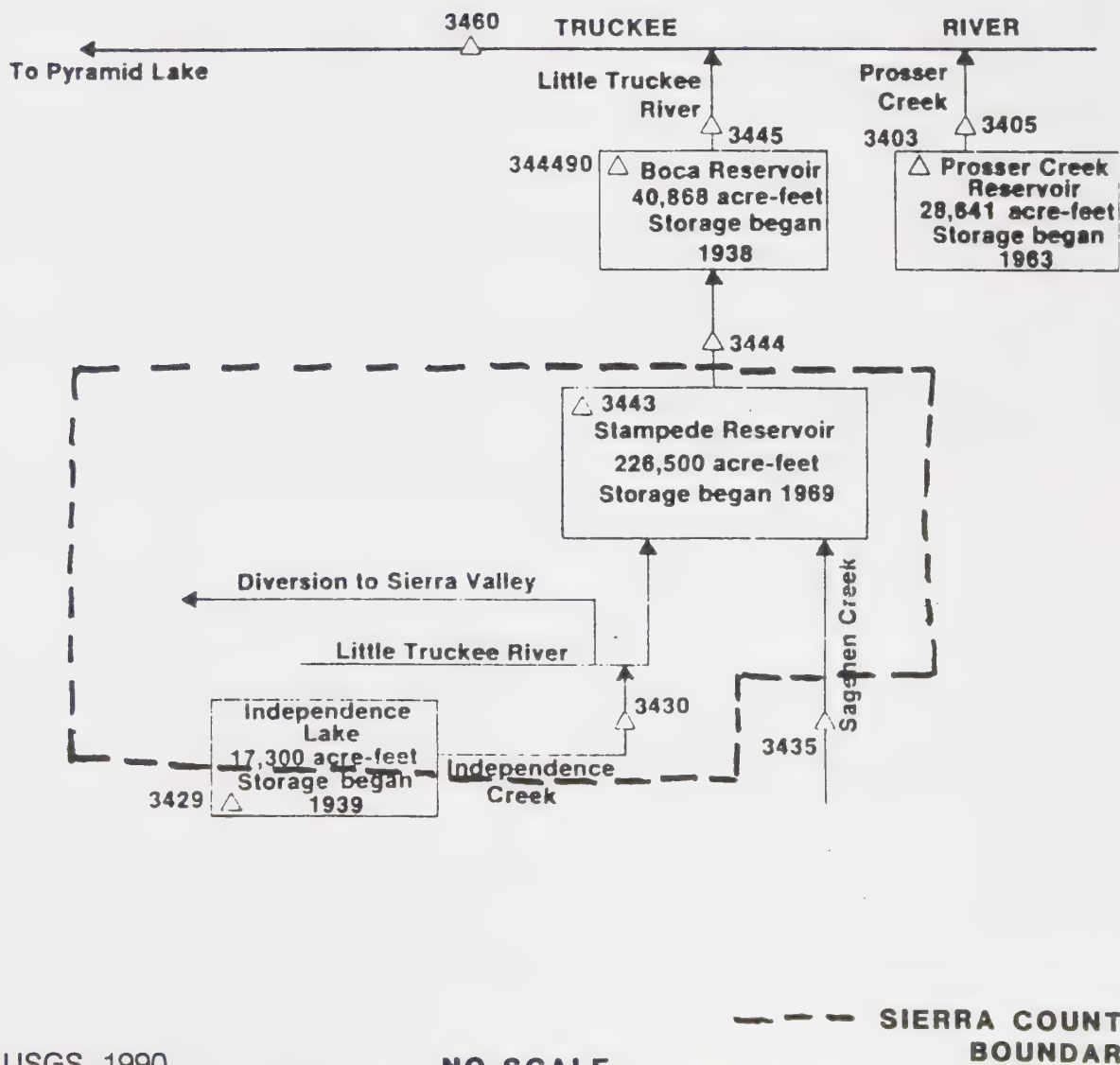
Water is diverted from the Little Truckee River above Independence Creek into Cold Stream for transport to Sierra Valley. The average diversion is estimated at 7,039 af/yr (DWR, 1973) as previously stated in the Sierra Valley Unit section of this report.

Independence Lake has a drainage area of 8 sq. mi. (DWR, 1991), almost entirely in Nevada County. Independence Creek, gaged by the USGS below Independence Lake just inside Sierra County, has a drainage area above this point of 8.1 sq. mi. (USGS, 1990), with an average flow of 18,760 af/yr (USGS, 1990).



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SOURCE: USGS, 1990.

NO SCALE



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Sagehen Creek, which joins the Little Truckee River at Stampede Reservoir, is gaged at a location in Nevada County just south of Sierra County. This gaging station measures drainage from an area of approximately 10.5 sq. mi., primarily in Nevada County, with an average flow measured at 9,060 af/yr (USGS, 1990). Stampede Reservoir collects drainage from 136 sq. mi. of the Little Truckee River watershed (DWR, 1991). Below Stampede Reservoir, just outside of the Sierra County boundary, a USGS stream gage measures the flow in the Little Truckee River. The drainage area above this location is 146 sq. mi., with an average flow of 136,200 af/yr (USGS, 1990).

Assuming that the drainage areas and flows at the Independence and Sagehen Creek gaging stations represent entirely Nevada County waters the entire area of the Little Truckee River watershed in Sierra County can be estimated at 127.4 sq. mi. with an average flow of 108,380 af/yr, not including the approximately 7,039 af/yr that is transferred into the Sierra Valley through the Little Truckee Ditch.

From the USGS quadrangles the drainage area of the Dog Creek watershed is estimated to be about 30 sq. mi.

Halatyn (1969) estimated that approximately 157 sq. mi. of the Little Truckee Unit is located within Sierra County. Considering that the entire drainage area of the Little Truckee River is 167 sq. mi. (USGS, 1990), Sierra County contains 94% of this total drainage area. The average flow from the entire Little Truckee Unit is 180,000 af/yr (DWR, 1960).

#### **LAHONTAN DRAINAGE BASIN: Herlong Hydrographic Unit**

**PHYSICAL SETTING** — The Herlong Hydrographic Unit (Herlong Unit), located in the northeast corner of Sierra County, is comprised of the southern portion of Long Valley and the surrounding mountains. The Sierra County portion of the Herlong Unit is bounded on the north by the County Line with Lassen County, on the east by the state line with Nevada, on the south approximately by a line extending from near Babbitt Peak towards the east to the state line, and on the west by a line extending from Babbitt Peak to Mount Ida Coolbrith. The Herlong Unit drains to the north through Long Valley into Lassen County, eventually reaching the Honey Lake sink.

The major surface water feature in the Herlong Unit is Long Valley Creek. Draining the mountains in a generally easterly direction into Long Valley Creek, are Evans Canyon, Balls Creek and Purdy Creek.



**DRAINAGE AREAS AND AVERAGE FLOWS** — Halatyn (1969) estimated that about 50 sq. mi. of the Long Valley Creek watershed is in Sierra County.

Long Valley Creek was gaged by the DWR (1960) in Lassen County near Scotts Road, outside of the Sierra County boundary to the north. This stream gage measured an average flow of 11,300 af/yr from a drainage area of 114 sq. mi. (DWR, 1960). Thus, based on Halatyn's estimate, about 44% of this drainage area is in Sierra County. The entire drainage area of the Herlong Unit is estimated at 567 square miles with an average runoff 30,000 af/yr (DWR, 1960). The Sierra County portion of this total is about 9% based on the Halatyn estimate cited above.

## **Springs**

The USGS (1915) identified only one significant spring in Sierra County, the Campbell Hot Springs in Sierra Valley near Sierraville, consisting of eight thermal springs. These springs are used for recreational bathing. The largest spring is reported to flow at 30 gallons per minute (gpm). The water from these springs is high in minerals.

There are numerous springs located on the USGS quadrangles for Sierra County, particularly at higher elevations along ridges and the Sierra crest. In addition, there are probably additional springs in Sierra County that are not located on the USGS quadrangles. Cataloging the locations of the numerous springs in Sierra County is beyond the scope of this report except for those developed by the larger water systems in the county. In general, springs are considered part of the surface water system, and are included in the surface water rights of the next section.

With the exception of the Sierra County Waterworks District No. 1 which serves Calpine from wells, the Sierra County Service Area 5A (Sierra Brooks) water system, and the Downieville Public Utility District which supplies Downieville from the North Downie River and Pauley Creek, all of the larger water systems in the County rely on springs for water supply. The use of springs for water supply in Sierra County was investigated by contacting the owners of water supply systems on the Sierra County Environmental Health Department (SCEHD) list of Water Services in the County. This information obtained was augmented with data contained in previously published reports from government agencies. The following paragraphs briefly describe water use by selected districts. Further information on these Districts and others which supply water is presented in the Public Facilities Element.



**Goodyears Bar Water.** The Goodyears Bar Water Company serves approximately 12 connections around the community of Goodyears Bar in the Goodyears Creek watershed. The sources of water is an unnamed spring that feeds Woodruff Creek. A metal aqueduct conveys the water by gravity to various small tanks near the service connections.

**R. R. Lewis Water Company.** The R. R. Lewis Water Company provides water for the Sierra Lands Subdivision, Lewis Ranch Estates, and surrounding areas in Sierra City, located in the central portion of Sierra County, part of the North Yuba River watershed. The Company obtains its water from Wixon Spring and Anderson Spring. Water from the North Yuba River provides for fire protection only. There are approximately 92 active connections (47 full time and 45 part-time residents) at this time, with the potential for 162 connections available. The water is pumped into storage tanks, filtered, and then gravity fed to its users. The average water use for 1991 was 196 gallons per day per service connection, or approximately 18,000 gallons per day for the entire company. A hook-up moratorium is in place at this time due to water quality problems recorded in the past.

**Sierra City Water Works.** The Sierra City Water Works provides water to Sierra City in the central portion of Sierra County. Located in the North Yuba River watershed, Sierra City Water Works obtains its source of water from an unnamed spring. The 72 customers use 124,000 gallons per day. The water is piped via 4 inch piping to a 15,000 gallon storage tank, then distributed to the users. The water quality meets all California State requirements.

**Alleghany County Water District.** The Alleghany County Water District is located in the south-western portion of Sierra County serving the City of Alleghany. The District uses a total of seven springs as its source of water in the Kanaka Creek watershed. There are a total of 55 water connections using approximately 300,000 gallons per month. The water is pumped via 6 inch piping to a 150,000 gallon reservoir tank. The water is then filtered and chlorinated prior to being gravity fed to its users. The water quality meets all California State requirements.

**Sierraville Public Utility District.** The Sierraville Public Utility District supplies water to the town of Sierraville, located in the eastern part of Sierra County on the southwestern edge of Sierra Valley. The source of water is springs that flow into a lined 300,000 gallon reservoir for distribution to an estimated 100 connections serving approximately 350 persons. The natural flow of the springs is estimated at about 220,000 gpd.



**City of Loyalton.** The City of Loyalton is located in the south-eastern portion of the Sierra Valley water-shed, obtaining its water from two wells and a spring. The water is pumped into two storage tanks for distribution to 520 users. The amount of water used varies from 26,000,000 gallons per month in summer to 7,558,000 gallons per month in winter. The water quality meets all California State requirements.

## **Surface Water Rights**

Simply put by a layman, water rights in California are based on the fundamental principal of beneficial use. This principle holds that there is no right to water if it is not put to a beneficial use, either water supply (domestic, municipal, and industrial), irrigation, fish and wildlife, recreation, stockwatering, hydroelectric power generation, mining, groundwater recharge, or water quality protection/enhancement. Beyond this fundamental principle water rights become extremely complicated due to overlapping legal doctrines that are a result of California's unique historical development. Surface water rights in California are governed by a hybrid system of law incorporating both riparian and prior appropriation doctrines.

An examination of surface water rights in Sierra County was initiated by obtaining all water rights on file with the State Water Resources Control Board (SWRCB) in a computer print-out. The types of water rights records stored by the SWRCB and present in California are appropriative, stockpond, small domestic, power, federal filings, and statements of diversion and use. A total of 333 records are contained in the SWRCB files, with 221 appropriative, 3 small domestic, 2 power, 70 statements of diversion, 6 stockpond, and 31 federal filings.

The surface water rights are summarized in Tables 8-3 through 8-8, segregated on the basis of hydrographic unit, watersheds, tributary, and water rights quantities. These tables are intended to provide only a general overview of the locations and quantities of recorded surface water rights in the County, as a mechanism for examining present use and availability of water. The tables do not contain all of the detailed information available from the SWRCB files including the intended use or dates of diversion. In addition, there may be other valid water rights within the County that are not on file with the SWRCB, and are therefore, not included in the summary tables.

Water rights are also divided into diversion rights and storage rights by the SWRCB, a convention that is followed in Tables 8-3 through 8-8. In general, diversion rights cannot physically be exercised throughout the entire year



**Table 8-3**  
**NORTH YUBA UNIT SURFACE WATER RIGHTS**

SOURCE/TRIB.	OWNER	-----DIVERSION-----	STORAGE (acre-feet)
<u>Haypress Creek Watershed</u>			
Milton & Haypress Creeks	Manufact. Hanover Trust	68.400 CFS	
Milton & Haypress Creeks	Manufact. Havover Trust	105.000 CFS	
Wild Plum Spring	Tahoe N.F.		1,950 GPD
Hilda Creek	Tahoe N.F.		2,350 GPD
Hilda Creek	Tahoe N.F.		2,350 GPD
<u>North Yuba River Watershed</u>			
North Yuba River	Harris		600 GPD
	Reveley		500 GPD
	Squires		500 GPD
	Pearson		500 GPD
	Trujillo		300 GPD
	Hill		4,000 GPD
	Brooks		500 GPD
	Mackey		500 GPD
	Golden		220 GPD
	Schroeder		500 GPD
	Clover		2,000 GPD
	Tahoe N.F.		350 GPD
	Miller		1,000 GPD
	Craeynest		2,850 GPD
North Yuba River	Tschopp Mutual Water	0.060 CFS	
Wixon Spring			
North Yuba River	Tahoe N.F.		250 GPD
North Yuba River	R. R. Lewis Water	0.060 CFS	
Wixon Spring			
North Yuba River	Maple Grove Mutual Wa.	0.020 CFS	
Wixon Spring			
North Yuba River	Cartwright		0.80
Howard Creek			
North Yuba River	Pollard	3.000 CFS	
	Pollard	2.000 CFS	
	County of Sierra	152.000 CFS	
	Tahoe N.F.		700 GPD
	Forsythe		3,000 GPD
	R. R. Lewis Water		16,000 GPD
	R. R. Lewis Water	0.125 CFS	
	Tahoe N.F.		5,400 GPD
Carvin Cr./N. Yuba R.	Reader	0.145 CFS	0.40
North Yuba River	Marriott		700 GPD
	Reader		0.60
	CA Dept of Trans.		3,000 GPD
	R. R. Lewis Water		150 GPD
	Smee & Norton		500 GPD
	Richardson		200 GPD
	Jacobs		200 GPD

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**Table 8-3 (cont.)**  
**NORTH YUBA UNIT SURFACE WATER RIGHTS**

SOURCE/TRIB.	OWNER	-----DIVERSION-----	STORAGE (acre-feet)
<u>Noth Yuba River Watershed (continued)</u>			
Salmon Creek	Newfamer	200 GPD	
Sardine Creek	Henwoods Associates	22.000 CFS	975.00
Gold Point Ravine	Lashells	160 GPD	
Independence Ravine	Tahoe N.F.	300 GPD	
Hardy Spring	Campbell	2,700 GPD	
Grass Lake Creek	Tahoe N.F.	17,500 GPD	
Organ Creek	Tahoe N.F.	0.078 CFS	
Consumnes River	Wood	0.060 CFS	
Arizona Tunnel Spring	Tahoe N.F.	1,150 GPD	
UNSP(2)	Tahoe N.F.	1,150 GPD	
Cold Spring	Marshall	300 GPD	
Cold Spring	Walker	300 GPD	
Cold Spring	Fugua	300 GPD	
Anderson Spring	R. R. Lewis Water	0.100 CFS	
Cedar Spring	Maple Grove Mutual Wa.	1,000 GPD	
Hungry Mouth Canyon	Davison	5,000 GPD	
I.T. Mooney Spring	Taylor	771 GPD	
Mooney Spring	Rosen	3,056 GPD	
San Juan Canyon	DeJonghe	1.100 CFS	
Salmon Creek	Tahoe N.F.		380.00
Sawmill Creek	Tahoe N.F.		350.00
Sardine Creek	Tahoe N.F.	2,000 GPD	280.00
Church Creek	Tahoe N.F.		130.00
Packer Creek	Tahoe N.F.		90.00
Waterfall Creek	McKibbin	500 GPD	
Salmon Creek	Tahoe N.F.		250.00
Carvin Creek	Parsons	400 GPD	
Sardine Creek	Tahoe N.F.		1,000.00
Salmon Creek	Tahoe N.F.		1.10
UNSP(2)	Bromley	2,500 GPD	
Small Spring	Hansen	60 GPD	
Sardine Creek	Goldstein	1.500 CFS	
Salmon Creek	Goldstein	1.500 CFS	



**Table 8-3 (cont.)  
NORTH YUBA UNIT SURFACE WATER RIGHTS**

SOURCE/TRIB.	OWNER	-----DIVERSION-----	STORAGE (acre-feet)
<u>Noth Yuba River Watershed (continued)</u>			
Carvin Cr./N. Yuba R.	Hill	400 GPD	
North Yuba River	Robbins	300 GPD	
	Parker	200 GPD	
	Frey	500 GPD	
	Hager	500 GPD	
	Reader	2,000 GPD	
	Adams	250 GPD	
	Jacobs & Walsh	400 GPD	
	Huntington	400 GPD	
	Jurek	200 GPD	
	Tahoe N.F.	200 GPD	
	Tahoe N.F.	1,000 GPD	
	Tahoe N.F.	200 GPD	
	Tahoe N.F.	200 GPD	
	Tahoe N.F.	300 GPD	
	Phillips		3.30
	Herrington's Sierra P.	0.200 CFS	
	Herrington's Sierra P.	0.050 CFS	
	Tahoe N.F.	200 GPD	
	Smith	0.233 CFS	
	R. R. Lewis Water	150 GPD	
	Merlino	400 GPD	
	Sierra City Water	0.160 CFS	
	DeJonghe	0.050 CFS	
	Smith	500 GPD	
	Marcantonio	0.100 CFS	
	Tahoe N.F.	9,700 GPD	
	Tahoe N.F.	800 GPD	
	Rentier Inc.	1,800 GPD	
	Marcantonio	400 GPD	
	Tahoe N.F.	4,800 GPD	
	Tahoe N.F.	2,400 GPD	
	Tahoe N.F.	270 GPD	
	Tahoe N.F.	200 GPD	
	Tahoe N.F.	200 GPD	
	Tahoe N.F.	250 GPD	
	Goldstein	1.500 CFS	
	Goldstein	1.500 CFS	
	Green Acres Property	0.033 CFS	

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**Table 8-3 (cont.)**  
**NORTH YUBA UNIT SURFACE WATER RIGHTS**

SOURCE/TRIB.	OWNER	-----DIVERSION-----	STORAGE (acre-feet)
<u>Pauley and Lavezzola Creeks Watershed</u>			
Empire Creek	Huber	3.000 CFS	
Empire Creek	Jones	1.200 CFS	
Empire Creek	Dodson	0.064 CFS	
Nigger Creek	Emery	2.500 CFS	
Nigger Creek	Emery	0.400 CFS	
Pauley Creek	Downieville PUD	1.110 CFS	
Pauley Creek	Dobbs		83 GPD
Lavezzola Creek	Renney		300 GPD
Lavezzola Creek	Renney		266 GPD
Butcher Ranch Creek	Tahoe N.F.		120 GPD
<u>Downie River Watershed</u>			
Downie River	Gaddy	0.160 CFS	
Downie River	Gaddy		70 GPD
Daves Ravine	Evans	0.025 CFS	
Grapevine Ravine	Gomes		1,900 GPD
<u>Goodyears Creek Watershed</u>			
Goodyears Creek	Ponta		1,400 GPD
" "	Arighi Family Trust		3,800 GPD
" "	Rollins		2,160 GPD
" "	Rollins		1,500 GPD
" "	Green		2,000 GPD
" "	Tahoe N.F.		400 GPD
" "	Baker		1,125 GPD
Drury Ravine	Rollins	0.075 CFS	
Coyote Ravine	Nelson		4,500 GPD
Saddle Back Spring	Tahoe N.F.		400 GPD
Drury Ravine	Koolery		2,000 GPD
Drury Ravine	Black		2,000 GPD
Gentle Anne Spring	Tahoe N.F.		1,400 GPD
Gentle Anne Spring	Tahoe N.F.		340 GPD
North Yuba River	Bertillion		590 GPD
" " "	McIntosh		465 GPD
" " "	Knutson	0.150 CFS	
" " "	Tahoe N.F.		275 GPD
" " "	Tahoe N.F.		1,400 GPD
" " "	Tahoe N.F.		200 GPD
" " "	Tahoe N.F.		200 GPD
Woodruff Creek	Ponta	0.055 CFS	
Rock Creek	Ruby Development Co.	0.333 CFS	
Rock Creek	Heller	0.450 CFS	
Rock Creek	Sloan		1,400 GPD
Spanish Ravine	Bertillion		600 GPD
Water Box Ravine	Alpha Hardware & Supply	2.000 CFS	
Spanish Ravine	Bertillion		2,000 GPD
Woodruff Creek	Butz		7,200 GPD
Woodruff Creek	Durrett	0.025 CFS	
Rock Creek	Bertillion	0.600 CFS	
Woodruff Creek	Bertillion		825 GPD



**Table 8-3 (cont.)**  
**NORTH YUBA UNIT SURFACE WATER RIGHTS**

SOURCE/TRIB.	OWNER	-----DIVERSION-----	STORAGE (acre-feet)
<u>Little Fiddle Creek Watershed</u>			
Indian Creek	Cory	575 GPD	
Indian Creek	Simmons	850 GPD	
Grant Ravine and Indian Creek	Pencik	3.000 CFS	
Halls Ranch Spring	Tahoe N.F.	1,950 GPD	
Mine Tunnel	Renoir & Brown	5,760 GPD	
Grant Ravine	Collet	600 GPD	24.00
Wet Ravine	Dickey Exploration	0.134 CFS	
Cherokee Creek	Christensen	7,000 GPD	
Fiddle Creek	Ellsworth	3.000 CFS	
" "	Tahoe N.F.	1,600 GPD	
" "	Tahoe N.F.	2,750 GPD	
" "	Tahoe N.F.	100 GPD	
Little Fiddle Creek	Tahoe N.F.		0.20
Pourier Creek	Pencik	0.890 CFS	
North Yuba River	Sierra Pacific Indust.	5,000 GPD	
" "	Christensen	4,000 GPD	
" "	Tahoe N.F.	1,050 GPD	
" "	Tahoe N.F.	7 GPD	
" "	Tahoe N.F.	7 GPD	
Oak Valley Creek	Pencik	0.670 CFS	
Oak Valley Creek	Pencik		6.00
Oak Valley Creek	Pencik	3.000 CFS	
<u>Canyon Creek Watershed</u>			
Deadwood Spring	Tahoe N.F.	1,950 GPD	
Thomas Ellis S. 3 and 4	Vivian	1,600 GPD	
<u>Slate Creek Watershed</u>			
Pilot Lake	Reg. Baptist Camp		87.00
UNSP(2)	Reg. Baptist Camp	9,750 GPD	



**Table 8-4**  
**MIDDLE YUBA RIVER UNIT SURFACE WATER RIGHTS**

SOURCE/TRIB.	OWNER	-----DIVERSION-----	STORAGE (acre-feet)
<u>Pass Creek Watershed</u>			
Pass Creek	Nevada Irrig. Dist.	0.222 CFS	
" "	Tahoe N.F.		2,000 GPD
" "	Tahoe N.F.		750 GPD
" "	Tahoe N.F.		3,000 GPD
" "	Tahoe N.F.		3,000 GPD
<u>Middle Yuba River Watershed</u>			
Middle Yuba River	Yuba County Wa. Ag.	800.000 CFS	3,900.00
" " "	Yuba County Wa. Ag.	910.000 CFS	177,400.00
" " "	Yuba County Wa. Ag.		514,000.00
" " "	Yuba County Wa. Ag.	1,800.000 CFS	490,000.00
" " "	Marceau		5.00
Bear Creek	Nestor	1.000 CFS	
Buckeye Ravine	Original 16 to 1 Mine	1.000 CFS	
Buckey, Hook, and Bull Ravines	Original 16 to 1 Mine	0.500 CFS	
<u>Kanaka Creek Watershed</u>			
Kanaka Creek	Criswell		2,880 GPD
Kanaka Creek	Turner		20 GPD
Cold Spring	321 Mines Inc.	2.500 CFS	
Jerrett Spring	Tahoe N.F.		5,500 GPD
N. Fork Kanaka Cr.	Original 16 to 1 Mine	0.067 CFS	
N. Fork Kanaka Cr.	Original 16 to 1 Mine	0.089 CFS	
N. Fork Kanaka Cr.	Original 16 to 1 Mine	0.178 CFS	
N. Fork Kanaka Cr.	Original 16 to 1 Mine	0.067 CFS	
N. Fork Kanaka Cr.	Alleghany Water Dist.	0.051 CFS	
<u>Oregon Creek Watershed</u>			
Baker Spring	Tahoe N.F.		10,000 GPD
Gleason Spring	Tahoe N.F.		100 GPD
Edward Spring	Jackson, J.		400 GPD
Edward Spring	Jackson, M.		400 GPD
Thomas Ellis S. 1	Vivian		1,600 GPD
Thomas Ellis S. 2			
Thomas Ellis S. 3			
South Fork Oregon Cr.			
Grizzly Gultch	Briggs	0.066 CFS	
N. Fork Oregon Creek	Sunstrom		3,175 GPD
Grizzly Creek	Guyer	0.170 CFS	
Grizzly Gulch	Richardson		5.00
Grizzly Gulch	Crott		200 GPD
Grizzly Gulch	Schroll	0.400 CFS	
Grizzly Gulch	Helm	0.027 CFS	
Marion Cr.	Kohler		0.50



**Table 8-5**  
**MIDDLE FEATHER RIVER UNIT SURFACE WATER RIGHTS**

SOURCE/TRIB.	OWNER	-----DIVERSION-----	STORAGE (acre-feet)
<hr/>			
<u>Gold Lake Watershed</u>			
Gold Lake	Twist	5,850 GPD	
Gold Lake	Robinson	600 GPD	
Gold Lake Spring	Tahoe N.F.	1,950 GPD	
<hr/>			
<u>Sulphur Creek Watershed</u>			
Boulder Creek	Mohawk Valley Ranch	2.000 CFS	
<hr/>			



**Table 8-6**  
**SIERRA VALLEY UNIT SURFACE WATER RIGHTS**

SOURCE/TRIB.	OWNER	-----DIVERSION-----	STORAGE (acre-feet)
<u>Sierra Valley Watershed</u>			
Sierra Valley Channels	Vleck	1.000 CFS	
" " "	Ferguson	1.000 CFS	
" " "	Torri	2.450 CFS	
" " "	Preciado	0.100 CFS	
" " "	Grandi	1.500 CFS	
" " "	Strong		0.10
" " "	Mello		5.00
" " "	Mello		1.00
" " "	Mello		0.20
" " "	Mello		2.80
" " "	Montgomery		49.00
Bonta Creek	Tahoe N.F.	16,000 GPD	
Treasure Spring Creek and Treasure Spring	Compton	500 GPD	
" " "	Cueto	552 GPD	
" " "	Baker	500 GPD	
" " "	Cowan	552 GPD	
Patterson Spring	Grandi	0.180 CFS	
Carman Creek	Tahoe N.F.		32.00
Unnamed Steam	Grandi	0.500 CFS	
Webber Spring	Tahoe N.F.	500 GPD	
Antelope Creek	Alderston		126.00
Dark Canyon	Tahoe N.F.	645 GPD	
Lemon Canyon	Tahoe N.F.	650 GPD	
Bear Valley Creek	Tahoe N.F.	1,500 GPD	
Lewis Mill Guard Station	Tahoe N.F.	2,900 GPD	
Cold Stream	Tahoe N.F.	2,250 GPD	
Turner Canyon	Tahoe N.F.	650 GPD	
Sardine Lookout Spr.	Tahoe N.F.	1,000 GPD	
Cold Stream	Hill	1,000 GPD	
Bear Valley Creek	Occidental Land Inc.		11.00
Bear Valley Creek	Occidental Land Inc.		11.00
Smithneck Creek	Occidental Land Inc.		7.00
Bonta Creek	Liahona Club	0.170 CFS	1.00
Cottonwood Creek.	Tahoe N.F.	1,100 GPS	
Smithneck Creek	Tahoe N.F.		11.00
Berry Creek	Jamison	1.900 CFS	



**Table 8-7**  
**LITTLE TRUCKEE RIVER UNIT SURFACE WATER RIGHTS**

SOURCE/TRIB.	OWNER	-----DIVERSION-----	STORAGE (acre-feet)
<u>Little Truckee River Watershed</u>			
Independence Lake	Sierra Pacific Power		17,500.00
Independence Lake	Sierra Pacific Power		17,500.00
Little Truckee River	US Bureau of Reclam.	350.000 CFS	126,000.00
"	CA Wa. Res. Con. B.		50,000.00
"	CA Wa. Res. Con. B.		50,000.00
"	US Bureau of Reclam.	225.000 CFS	126,000.00
"	Hall	0.022 CFS	
"	Wise		1,000 GPD
"	Tahoe N.F.		2,500 GPD
"	Tahoe N.F.		1,250 GPD
"	Bickford	3.750 CFS	
Perazzo Canyon	Mt. Lola Devel. Co.	3.350 CFS	1,007.00
Davies Creek	Payen	0.750 CFS	
"	Tahoe N.F.		500 GPD
"	Tahoe N.F.		500 GPD
"	Tahoe N.F.		500 GPD
"	Tahoe N.F.		500 GPD
Independence Creek	Indep. Cr. Properties		1,000 GPD
"	Tahoe N.F.		200 GPD
"	Tahoe N.F.		1,000 GPD
"	Colaizzi		900 GPD
Stampede Reservoir	Tahoe N.F.		3,500 GPD
Stampede Reservoir	Tahoe N.F.		500 GPD
Sardine Valley	Tahoe N.F.		500 GPD
Worn Mill Creek	Tahoe N.F.		300 GPD
Weber Lake	Borderre		36.00
Canyon 2 Spring	Tahoe N.F.		1,150 GPD
Henry's Spring	Kearney	0.500 CFS	
Mary's Spring	Payen	0.060 CFS	
Jammer Spring	Tahoe N.F.		100 GPD
Land Spring	Tahoe N.F.		200 GPD
Bathtub Spring	Tahoe N.F.		200 GPD
Barrel Spring	Tahoe N.F.		200 GPD
Hoke Spring	Tahoe N.F.		1,100 GPD
Sales Spring	Tahoe N.F.		500 GPD
<u>Dog Valley Watershed</u>			
Dog Creek	Sierra Pacific Power		15,600.00
Dog Creek	Sierra Pacific Power	150.000 CFS	15,600.00
Dog Creek	Toiyabe N.F.		1,250 GPD
South Branch Dog Cr.	Payen	0.830 CFS	
Sunrise Creek	Kronish Trust	1.250 CFS	
Truckee River	Kronish Trust	1.000 CFS	



Table 8-8  
HERLONG UNIT SURFACE WATER RIGHTS

SOURCE/TRIB.	OWNER	-----DIVERSION-----	STORAGE (acre-feet)
Balls Creek	Evans Ranch		6,252.00
Long Valley Creek	Evans Ranch		3,688.00
■     ■     ■	Jaksick & Brown		143.00
■     ■     ■	Jaksick & Brown		29.00
Donkey and Evans Canyon Creeks	Toiyabe N.P.	1 GPD	
Balls Creek	Green Gulch Ranch	8.400 CFS	6,000.00
Long Valley Creek	Green Gulch Ranch	2.600 CFS	4,200.00
Purdy Creek	Green Gulch Ranch	3.600 CFS	1,800.00
Long Valley and Purdy Creeks	Green Gulch Ranch	13.000 CFS	295.00
Long Valley, Purdy, and Balls Creeks	Green Gulch Ranch		576.00
South Creek	Jaksick & Brown		19.00

SOURCE: California, State Water Resources Control Board, 1992



due to a lack of streamflow during summer months. Storage rights are used to capture and store larger winter streamflow for diversions during summer months.

**Table 8-9**  
**SURFACE WATER RIGHTS TOTALS**  
**BY HYDROGRAPHIC UNIT AND WATERSHED**

Hydro- graphic Unit	Watershed	Diversion		Storage (af)
		(cfs)	(gpd)	
North Yuba Unit				
	Haypress Creek	173.4	6,650	0
	N. Yuba River	187.6	112,887	3,461
	Pauley/Lavezzola	8.3	769	0
	Downie River	0.2	1,970	0
	Goodyears Creek	3.7	38,180	0
	Little Fiddle	10.7	31,249	30
	Canyon Creek	0	3,550	0
	Slate Creek	0	9,750	87
	Totals	383.9	205,005	3,578
Middle Yuba				
	Pass Creek	0.2	8,750	0
	Middle Yuba River	3,512.5	2,160	1,185,305
	Kanaka Creek	3.0	8,400	0
	Oregon Creek	0.7	15,875	6
	Totals	3,516.4	35,185	1,185,311
Sierra Valley — Sierra Valley		8.8	30,299	257
M. Feather				
	Gold Lake	0	8,400	0
	Sulphur Creek	2.0	0	0
	Totals	2.0	8,400	0
L. Truckee				
	Little Truckee	583.4	18,100	388,044
	Dog Valley	153.1	1,250	31,200
	Totals	736.5	19,350	419,244
Herlong — Herlong		27.6	1	23,002
TOTALS		4,675.2	298,240	1,631,392

SOURCE: Applied Science & Engineering, 1993, Table 8.

Tables 8-3 through 8-8 also list diversions segregated based on the units of flow used to quantify the diversion. This essentially distinguishes between large diversions expressed in cubic feet per second (cfs) and small diversions expressed in gallons per day (gpd). This distinction in diversion size is



possible because 1 cfs is approximately equivalent to 645,000 gpd for an equivalent time period. The small diversions are primarily for use as water supply, stockponds, recreation, or small scale irrigation. The large diversions are associated with large scale irrigation, hydroelectric power generation, and exports to neighboring counties.

Finally, the tables do not include downstream water rights that may affect the ability of upstream users to divert water. For example, the YCWA holds water rights on the North Yuba River at New Bullards Bar Reservoir in Yuba County which incorporates waters emanating from Sierra County. These YCWA water rights would have legal precedence over any future upstream diversions by virtue of prior appropriation. Additional water rights as far away as the Sacramento Valley and even the delta could affect the future availability of water for upstream users. These downstream water rights are not included because they occur outside Sierra County.

Table 8-9 contains a summary of the cumulative total diversion rights for each watershed according to the units of diversion and storage rights. Note that the smaller diversions in the gpd units column probably account for less than 1% of the water rights diversions in each watershed, assuming that all diversions are continuous throughout the year.

**North Yuba Unit.** The largest quantity of smaller diversions occurs in the North Yuba Unit. The majority of diversions are in the North Yuba River watershed, probably related to water supply for the population and recreation centers of western Sierra County. Large diversions in the North Yuba Unit occur in the Haypress Creek watershed and the North Yuba River watershed. The Haypress Creek watershed large diversions are claimed by Manufacturers Hanover Trust Company of California on Haypress and Milton Creeks as hydroelectric power generation rights exercised on a year round basis, and as such should not consume the water, leaving it available for downstream users. The present status of these water rights is unknown.

The large water diversions in the North Yuba River watershed are claimed primarily by the County of Sierra and Henwoods Associates, with a collection of numerous other claimants with smaller magnitude diversions. Sierra County has a right to divert 152 cfs, restricted to November through mid-July, and designated for use in power generation on the North Yuba River. Henwood Associates claims 22 cfs year round for power generation on Salmon and Sardine Creeks. Both of these water uses should not consume the water leaving it available for downstream use. The present status of both these water rights is unknown.



Large storage rights in this unit occur in the North Yuba River watershed, associated with Tahoe National Forest recreation and fish and wildlife uses as well as the Henwoods Associates power generation rights.

The YCWA holds surface water rights on the North Yuba River downstream of Sierra County at New Bullards Bar Reservoir that are not included in the tables.

The original application to the SWRCB for diversion and storage rights at Our House and New Bullards Bar was granted, after challenge and subject to agreement with the California Department of Fish and Game (CDF), with capacities of diversion at New Bullards Bar limited to 3,800 cfs and storage to 930,000 acre-feet.

The availability of additional water rights on the North Yuba River was examined by calculating the current average YCWA diversion at New Bullards Bar as the difference between the pre-project diversion (below Bullards Bar in Table 8-2) and after project diversion (below New Bullards Bar in Table 8-2) at 848,400 af/yr. The sum of the average flows emanating from Sierra County in the North Yuba River (547,000 af/yr at St. Catherine Creek), the Sierra County portion of Slate Creek (assumed to be 50% of Slate Creek before the diversion at 109,000 af/yr), and Canyon Creek (assumed roughly equivalent to Slate Creek prior to the diversion at 218,500 af/yr) is equal to 874,500 af/yr. The difference between the present YCWA average annual diversion at New Bullards Bar and the estimate of flow emanating from Sierra County is 26,100 af/yr, equivalent to a 1,600 gpd over an entire year. Based on this simplistic calculation it appears that 26,100 af/yr may be available in an average year. However, this calculation does not include water users located even farther downstream in the Sacramento Valley as far away as the delta. Thus, based on this admittedly simplistic calculation, the availability of additional water rights on the North Yuba River in Sierra County is questionable in an average year.

**Middle Yuba Unit.** The Middle Yuba Unit has the largest amount of water diversion and storage rights, dominated by the large Middle Yuba River watershed diversions of the YCWA at Our House Dam. Of the 3,500 cfs YCWA rights only a 1,800 cfs diversion rights is allowed throughout the entire year, with the other diversions restricted to November through approximately July of the water year. The use of this water is primarily for power generation and some for water supply, with transfer of water to New Bullards Bar Reservoir through the Lohman Ridge Tunnel. The majority of the storage rights are restricted to the winter months of October through June. In spite of the fact that these water rights are primarily for non-consumptive power generation, their location near the downstream boundary of Sierra County and ultimate use at New Bullards Bar effectively restricts additional upstream uses.



A current instream water right for fish and wildlife is presently imposed at the Our House point of diversion that amounts to about 50 cfs or the natural flow between April and June, and 30 cfs or the natural flow at all other times.

The issue of YCWA water rights on the Yuba River has recently been brought before the SWRCB by the California Department of Fish and Game (CDFG) for review due to impacts on fisheries. The intent is to protect the fish resources of the Yuba River from excessive appropriations. This action may have been prompted in part by the sale of water by YCWA to southern California users over the past few years. This conflict is presently the subject of litigation between the YCWA and SWRCB over the jurisdiction of the SWRCB.

Not included in this tabulation are the water rights of NID on the Middle Yuba River at higher elevation at Milton and Jackson Meadows Reservoirs. Presumably these water rights are filed in Nevada County and as a result do not appear in the tables. As discussed in the previous section the USGS (1990) notes that nearly the entire flow of the Middle Yuba River is diverted into the Milton Tunnel during low to medium flows. Instream flow requirements for fish and wildlife requiring the release of 3 cfs or the natural flow at Milton Reservoir and 5 cfs or the natural flow and at Jackson Meadows are probably all that escape diversion during low flows. Thus, it would seem that additional water rights on the upper reaches of the Middle Yuba River are not available.

**Sierra Valley Unit.** In the Sierra Valley Unit there are a large number of small users probably associated with the population and recreation centers of the eastern portion of the County as well as some irrigation uses. The Tahoe National Forest possesses the largest diversion and storage rights in the unit for domestic, recreation, and fish and wildlife uses.

Sierra Valley surface water rights were expressly defined as part of the Middle Fork of the Feather River adjudication formalized in 1940, suggesting that the vast majority of surface water rights are presently allocated in the Sierra Valley Unit.

**Middle Feather Unit.** Surface water rights in the Middle Feather Unit of Sierra County are relatively small, reflecting the small drainage area that lies in Sierra County. Most of the water use is for domestic supply, with some fire protection for the Tahoe National Forest.

**Little Truckee Unit.** The Little Truckee Unit has the second largest water rights diversion and storage, reflecting the high degree of water resources development in this unit. In the Little Truckee River watershed the USBR holds the largest water rights with 575 cfs of diversion and 252,000 acre-feet of



storage rights on the Little Truckee River associated with Stampede Reservoir. This water is allocated to a wide variety of uses including power generation. Recent federal legislation has formally dedicated the Stampede reservoir water to the Pyramid Lake fishery, a use that should not significantly affect the power generation. Other large storage water rights holders in the Little Truckee River watershed are Sierra Pacific Power with 35,000 acre-feet at Independence Lake shared between municipal and power uses, and the SWRCB on the Little Truckee River with 100,000 acre-feet for a variety of uses. The major water rights in the smaller use category are held by the Tahoe National Forest for domestic, recreation, and fisheries uses.

In the Dog Valley watershed significant water rights are possessed by Sierra Pacific Power Company (Westpac Utilities) which has rights to store 31,200 acre-feet for domestic, municipal, recreation, fish and wildlife, and power on Dog Creek. In addition, Sierra Pacific Power has rights to divert about 150 cfs from Dog Creek for power generation. The Sierra Pacific Power Company also supplies water to the municipalities in Nevada.

The Little Truckee Unit waters have been the subject of historic battles between the states of Nevada and California, both literally and in the courts. The United States Congress passed legislation in 1990 to allocate waters between the two states in the Truckee-Carson-Pyramid Lake hydrographic province. This legislation included the waters of the Little Truckee Unit, specifically providing the Little Truckee Ditch diversion to Sierra Valley water users. This federal legislation allocated all available surface water in the Little Truckee Unit.

**Herlong Unit.** Surface water rights in the Herlong Unit total 27.6 cfs of diversions and 23,000 acre-feet of storage. Most of these rights are associated with ranches in the Long Valley area and their associated uses of irrigation and stock watering. The Herlong water rights were defined as part of the Long Valley Creek adjudication adopted in about 1976, thereby allocating the available surface water resources.

## **Groundwater**

The DWR (1975) maps two groundwater basin in Sierra County, the Sierra Valley Groundwater Basin (SVGWB), and the Long Valley Groundwater Basin (LVGWB) as shown in Figure 8-2. The majority of groundwater usage in Sierra County is in the SVGWB.

The DWR Central Division Well Data files were searched and all of the well logs located in Sierra County were obtained. An inventory of these records as of the end of 1991 shows that there were approximately 300 well logs on file. Of these records approximately 75% were located to the east of the Sierra



crest, predominantly in the Sierra Valley. These numbers indicate the importance of groundwater in the eastern part of the County.

**Sierra Valley Groundwater Basin.** PHYSICAL SETTING — The SVGWB extends from the southern edge of Sierra Valley in Sierra County to the north into neighboring Plumas County (Figure 8-2). Approximately one-third of the 200 square mile SVGWB lies in Sierra County, with the other two-thirds in Plumas County. The groundwater basin is comprised of younger alluvium, lake, and volcanic deposits of the Valley floor. The water-bearing materials on the Valley floor are estimated to be 2,000 feet thick (DWR, 1960). The boundary of the productive area of the SVGWB roughly corresponds to the Valley floor approximated by the 5,000 foot MSL elevation (Figure 8-2).

The principal water-bearing formations of the Valley are the lava flows, glacial outwash, lake and near-shore deposits, and Valley sediments. The thickness of these formations in the Sierra Valley are between 1,000 and 2,000 feet (DWR, 1963). In Sierra County the faults in the Valley floor have little, if any, effect on groundwater flow, except near Campbell Hot Springs and the thermal wells in the center of the Valley where water rises along the faults, mixes with deep percolating groundwater, and comes to the surface as hot water.

Unconfined groundwater underlies the Valley at shallow depth, with wells intercepting this groundwater usually less than 100 feet deep. Groundwater movement in this shallow, water table aquifer is generally in the direction of surface water flow, to the north. A large quantity of groundwater beneath the Valley is contained in numerous confined aquifers between depths of 100 and 2,000 feet. The surface of the confined groundwater slopes generally towards the northwest in Sierra Valley. A portion of the Valley has historically contained artesian, or flowing, wells that penetrate the confined aquifers. The reported yields of irrigation wells ranges from 600 to 3,200 gpm. The highest flow reported from an artesian well is 100 gpm (DWR, 1983).

Recharge of the groundwater occurs primarily by infiltration of surface waters through the permeable materials occurring in the upper portions of the alluvial fans bordering the Valley. Some recharge also occurs from direct precipitation into the higher elevation volcanic rocks, infiltration of precipitation into the Valley floor, and percolation of irrigation water.

GROUNDWATER QUANTITY — The groundwater storage capacity of the entire Sierra Valley, including the portions in Plumas County, has been estimated at about 7,500,000 acre-feet for the materials encountered to a depth of 1,000 feet (DWR, 1963). Assuming that this volume is distributed between the two counties (Sierra and Plumas) in proportion to their surface areas,



approximately 2,500,000 acre-feet of groundwater is stored in the Sierra County portion of the SVGWB.

In 1960 the DWR investigated the Sierra Valley groundwater resources without noting any overdraft conditions. Beginning in 1961 the DWR (1973) noted an area of increased pumping to the north of and adjacent to Loyalton. By 1972 this pumping had led to an area of temporarily depressed artesian water levels that extended into Sierra County around Loyalton (Figure 8-5). These depressed water levels reportedly recovered almost completely by the following year, although in some areas the recovery was not complete. The greatest effect of the decreased groundwater levels was a loss of free flow from artesian wells in the summer. In 1980, in response to continued problems with overdraft of the SVGWB a special district for groundwater management, the Sierra Valley Groundwater Management District (SVGWMD), was created by the California legislature.

Based on land and water use surveys the DWR (1983) concluded that groundwater pumpage increased in the entire Valley by 780 percent between 1972 and 1981 due to an all-time high planting of grain and truck crops in 1981. A hydrologic balance of the entire basin for 1981 concluded that there was a total groundwater withdrawal of 14,500 acre-feet, resulting in a decrease in groundwater storage of 11,000 acre-feet. This decrease in storage reflected the near drought climate which reduced groundwater recharge. However, the groundwater levels recovered prior to the 1983 irrigation season.

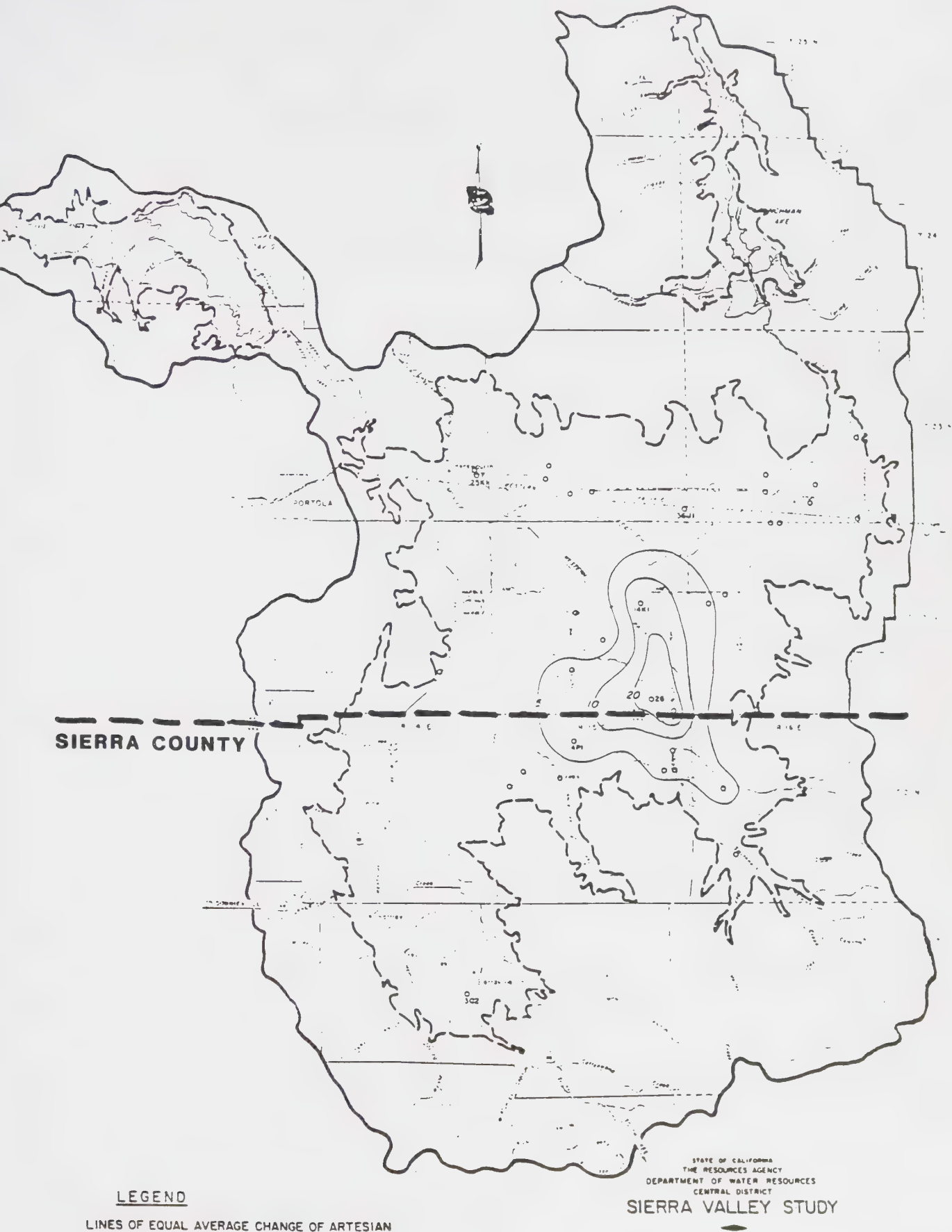
The development and concentration of groundwater pumping in the Vinton-Loyalton area has led to cessation of flow from artesian wells, ground subsidence, creation of a large pumping depression by the end of the irrigation season, and a temporary reversal of groundwater flow in the central portion of the basin from west to east rather than from south to north.

There was a noted change in groundwater elevations between spring 1981 and spring 1983, indicating a decline in water levels northwest of Loyalton measuring about 5 feet, with an increase in groundwater levels to the



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**FIGURE 8-5**  
**AREA OF TEMPORARY INFLUENCE OF**  
**PUMPING WELLS ON ARTESIAN GROUND WATER LEVELS**  
**SURFACE WATER SYSTEM**



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southeast of Loyalton in the Smithneck Creek drainage (DWR, 1983). The increase in water levels suggest the importance of the Smithneck Creek drainage to groundwater recharge in the central-eastern portion of the groundwater basin.

Another source of recharge is from adjacent uplands as described in the following excerpt from the Sierra Valley study (DWR, 1973, p. 157):

Although not considered a subsurface inflow into the Sierra Valley Basin, there is the underflow of ground water from the recharge areas into the lake deposits. This recharge takes place at every location around the edge of the basin where streams drain the highlands. Recharge to the lake sediments is also affected by precipitation entering the ground water body in the upland region and then percolating valleyward. The major upland recharge areas are shown on Plate 35. These areas are very important to the ground water basin operation. Not enough data are available to determine the amount of the annual recharge from these areas. Every effort should be made to keep the areas available for recharge.

Groundwater monitoring during the 1990-1991 water year, during another period of dry conditions, measured an average increase of two feet in water levels in Valley wells. The depression in the piezometric surface noted in the vicinity of Loyalton decreased in magnitude but increased in areal extent (DWR, 1991b). Metered groundwater pumping of 16 wells in the vicinity of Loyalton showed a total volume pumped of 3,875 acre-feet in 1991.

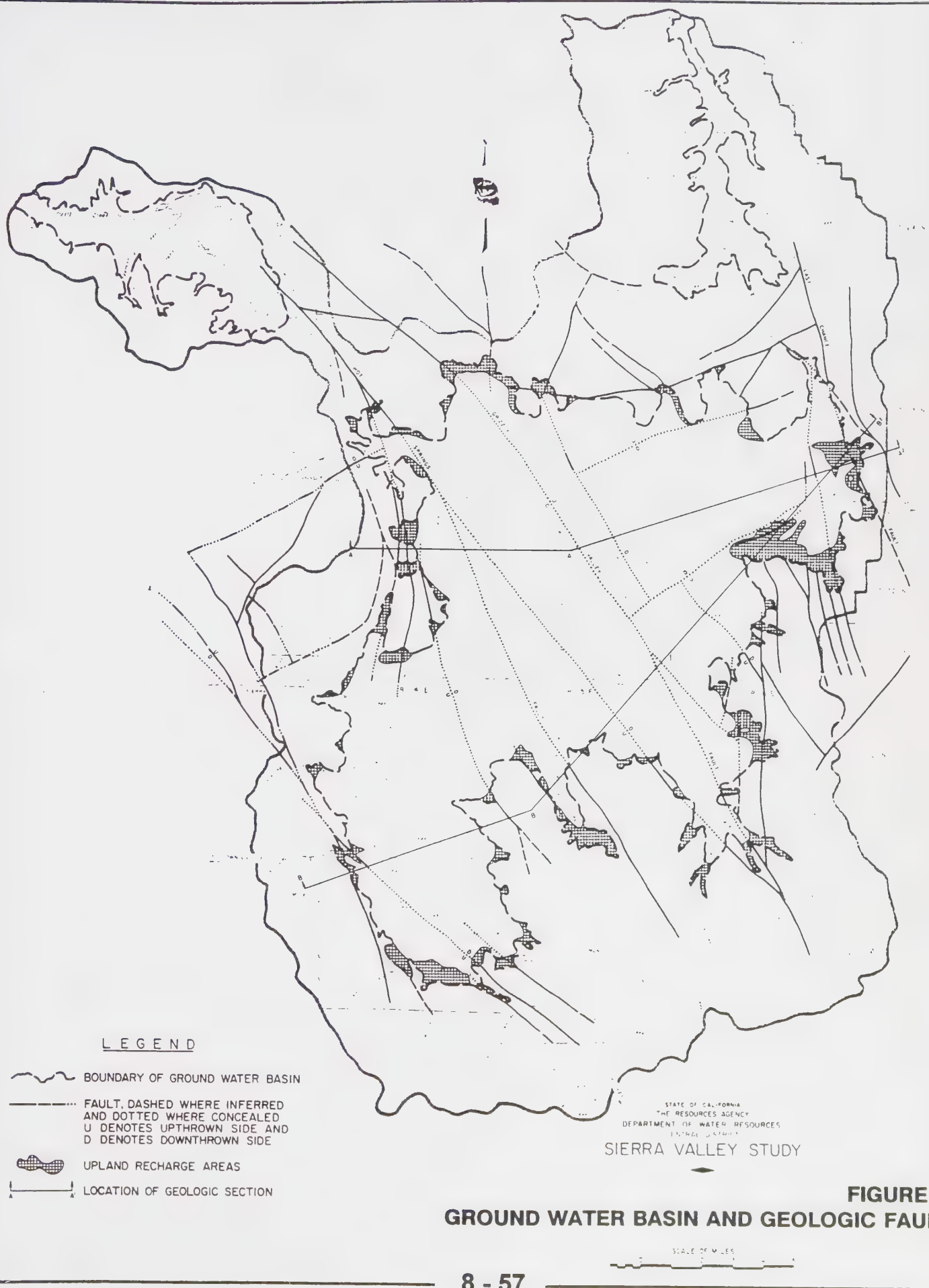
**GROUNDWATER QUALITY** — The quality of groundwater in the Sierra County portion of the SVGWB is generally good, suitable for most beneficial uses (DWR, 1963). However, some areas of high boron were noted by the DWR (1960) in the central part of the Valley. In addition, groundwater north and west of Loyalton is usually of poor quality. Thermal groundwater quality is also usually poor, sometimes containing high fluoride (DWR, 1960). The best quality groundwater occurs around the borders of the Valley, and the poorest in the west central portion of the Valley.

The DWR (1973) classified groundwater in the Sierra Valley according to irrigation classes (Figure 8-7). Groundwater underlying the central portion of Sierra Valley in Sierra County extending from the Plumas County line south to the center of the valley near Calpine was defined as Class III irrigation water, injurious to unsatisfactory, or Class II, good to injurious. Boron is generally associated with these Class II and III irrigation waters. The remainder of the SVGWB groundwater in Sierra County was classified as irrigation Class I, excellent to good.



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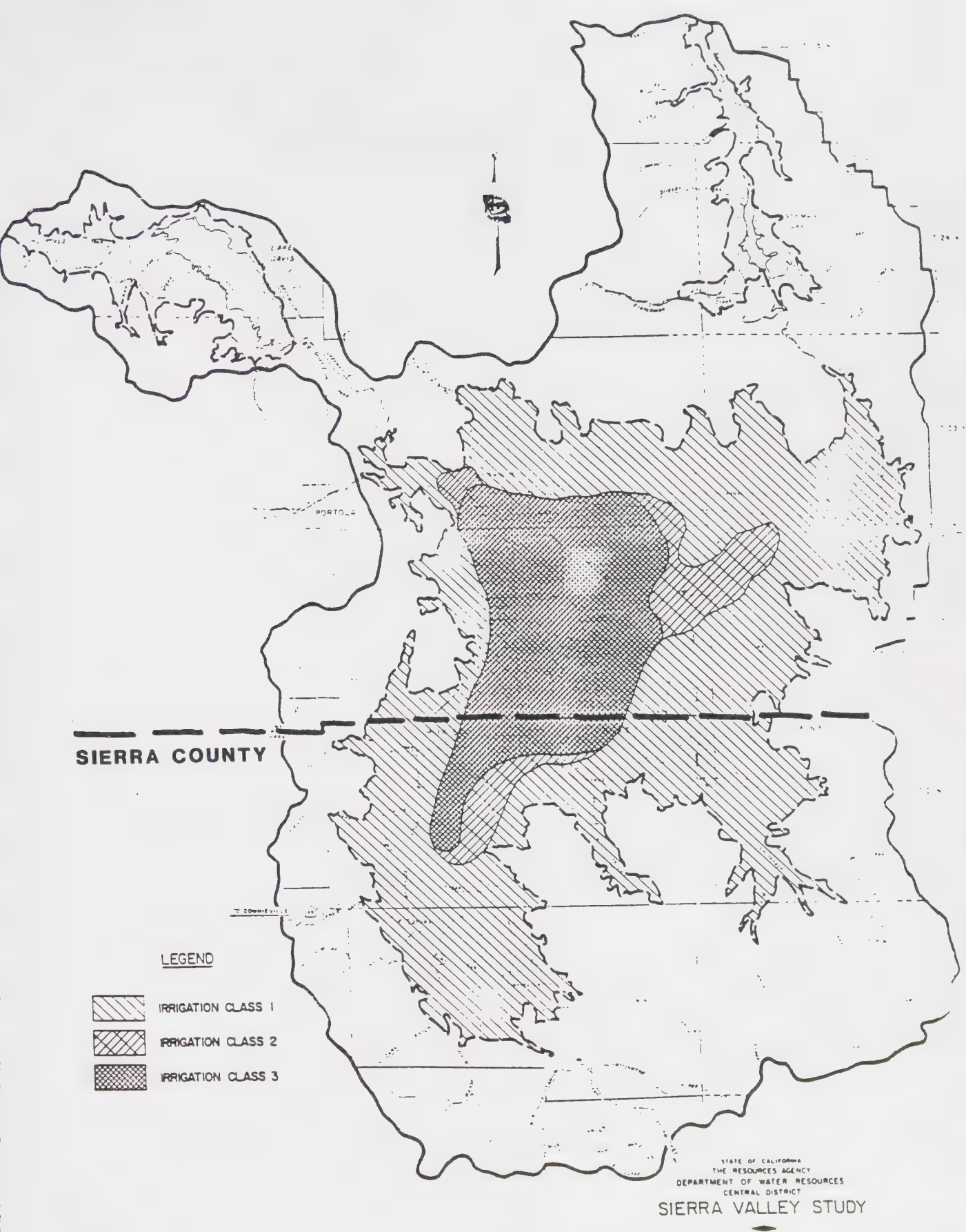


**FIGURE 8-6**  
**GROUND WATER BASIN AND GEOLOGIC FAULTS**



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**FIGURE 8-7**  
**IRRIGATION CLASS OF GROUND WATER**

SOURCE: DWR, 1973



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With respect to drinking water standards, iron has been measured at concentrations exceeding the recommended limit for drinking water in groundwater northwest of Loyalton. Fluoride at concentrations in excess of recommended drinking water standards occurs along the northern boundary of Sierra County in the central portion of Valley. The poorest quality groundwater in the Valley is associated with the thermal waters of the Campbell Hot Springs and along the Hot Springs fault which crosses the center of the Valley from northwest to southeast (Figure 8-8). Arsenic has been detected in a few wells penetrating the thermal waters.

**GEOTHERMAL** — The SVGWB encompasses the Beckwourth Peak Known Geothermal Resource Area (KGRA). As roughly outlined by the California Division of Mines and Geology (CDM, 1981) the Beckwourth Peak KGRA is located primarily in Plumas County, extending into Sierra County in the center of the Valley northwest of Loyalton. The Beckwourth KGRA roughly corresponds to the area of elevated groundwater temperatures mapped by the DWR (1973) and presented in Figure 8-8. The thermal waters of the KGRA are associated with groundwater rising from depth along buried faults that cross the Valley. The CDM (1981) located seven wells with elevated water temperatures in the Sierra County portion of the SVGWB. In addition, the Campbell Hot Springs of Sierra County are known to produce waters with elevated temperatures.

Due to the relatively low temperatures of the Sierra Valley thermal groundwaters, power generation is unlikely (DWR, 1973). Low temperature heating of buildings, agricultural operations, or industrial processes is the most promising potential use of thermal waters in Sierra Valley. CDM (1981) notes that the City of Santa Clara has purchased land east of the Valley with the intention of using the geothermal resources for space heating or industrial processes. (See the Energy Element for additional information on geothermal resources.)

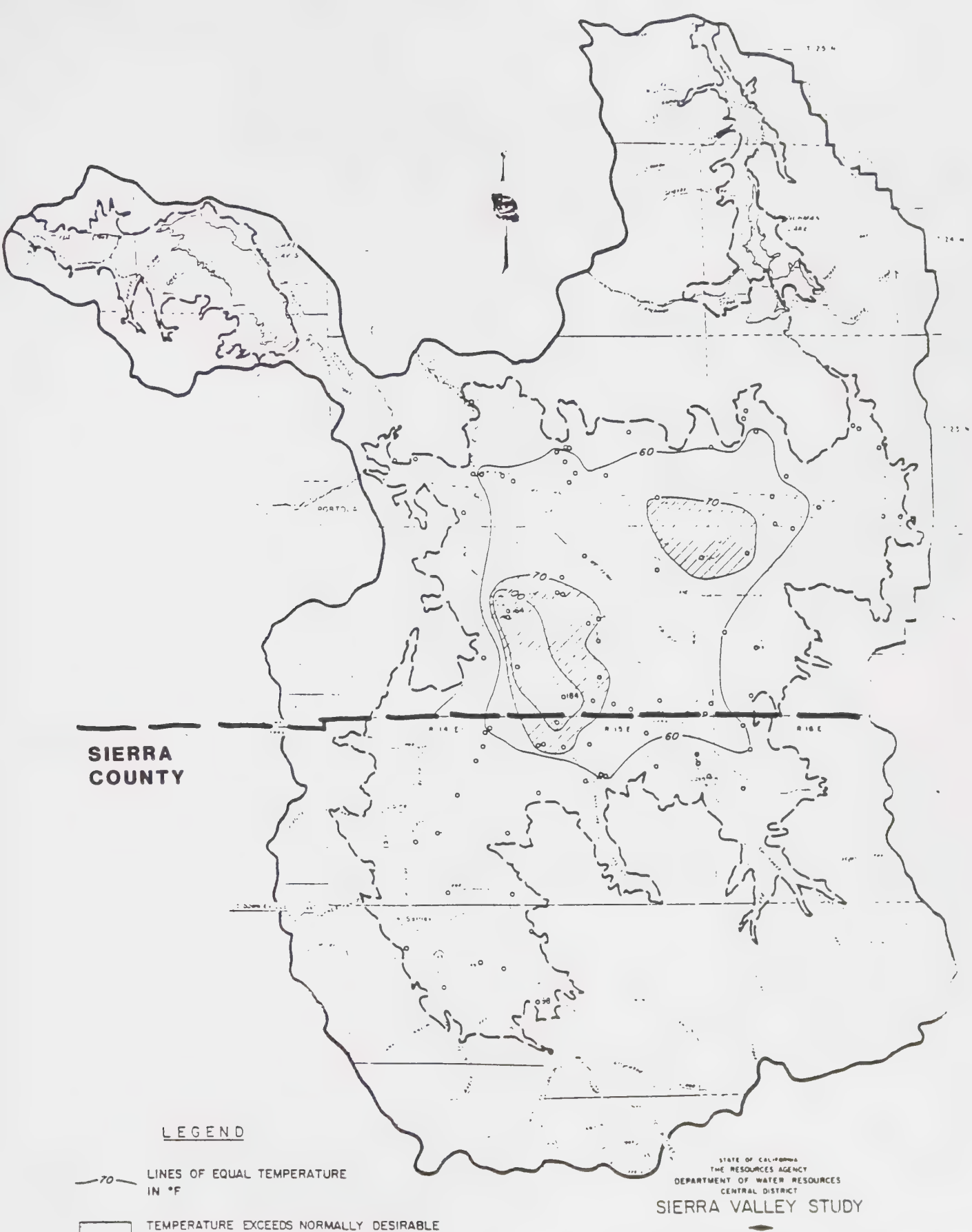
**Long Valley Groundwater Basin.** The LVGWB in the northeast corner of Sierra County extends to the north into Lassen County (Figure 8-2). About half of the LVGWB lies in Sierra County estimated at about 6 sq. mi., with the other half in Lassen County. Groundwater flow in the LVGWB probably mimics the flow of Long Valley Creek, draining to the north into Lassen County.

An inspection of DWR Central Region files located six wells in the Sierra County portion of the LVGWB. However, no published studies of the LVGWB were found during the literature search conducted for this report. The DWR records



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**FIGURE 8-8**  
**TEMPERATURE OF GROUND WATER**

SOURCE: DWR, 1973



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indicate that the six LVGWB wells for which there are records range in depth from sixty (60) to five hundred sixty (560) feet and range in flow rates from three (3) to eighty (80) gallons per minute (three of the wells were listed as test wells and three were listed as domestic wells). This information suggests that there may not be significant groundwater resources in the southern portion of the LVGWB where the six wells are located.

**Remainder of the County.** One area of the County that relies heavily on groundwater is around the community of Verdi along the eastern boundary of Sierra County in the Dog Valley watershed. Review of the well logs obtained from the DWR Central Section files found 35 wells are located around Verdi.

Approximately 73 wells were located in the western part of the County during the DWR Central Section file review. Based on an examination of these logs it is concluded that the majority of wells in the western part of the County are constructed in rock formations, and are probably relatively low yield. These wells are used for supplying individual residences or small water companies. The locations of wells in the western part of the County indicate that groundwater is an important source of water supply along the upland ridges, where surface water is not readily available. For example, of the 73 well logs located in the western part of the County, 52 were located around the town of Pike, on the western end of Pliocene Ridge.

## **Water Use**

Water is used in the County for water supply (domestic, municipal, and industrial), mining, stockwatering, irrigation, fish and wildlife, recreation, and hydroelectric power generation. Water is not consumed by fish and wildlife, recreation, or electrical power generation use but remains in the hydrologic system for possible reuse downstream. In addition, not all the water used for supply and irrigation is consumed, rather some portion reenters the hydrologic system as run-off, that can potentially be captured for reuse downstream.

Table 8-10 summarizes the most comprehensive data available on water use in the County (DWR, 1960). This data is based on a land use and population projections study. Although this data is old, and does not account for all categories of water use in the County, it is the best information presently available. The DWR estimated that the probable ultimate total water use in Sierra County will be 151,000 af/yr for the uses listed in Table 8-10.

**Water Supply.** The DWR (1960) estimated that the probable ultimate use of water for water supply in Sierra County would amount to 3,900 af/yr with the major use concentrated in the Sierra Valley and North Yuba Units. An estimate of the surface water use in the County was made based on the small diversion



water rights (Table 8-9), assuming that these small diversions represent the entire water supply use in the County and conservatively



**Table 8-10**  
**PROBABLE ULTIMATE WATER USE BY HYDROLOGIC UNITS**  
**(af/yr)**

Unit	Water Supply	Forest Products	Irrigation	Recreation	Marsh	Reservoir Evaporation	Total
North and Middle Yuba	1,700	200	7,000	1,700	0	1,300	11,900
Sierra Valley	2,000	100	81,800	700	0	1,900	86,500
M. Feather	<50	0	<50	<50	0	0	<50
L. Truckee	200	100	30,000	300	400	6,800	37,800
Herlong	<50	<50	14,900	<50	0	0	14,900
Totals	3,900	400	133,700	2,700	400	10,000	151,100

SOURCE: DWR, 1960



assuming they occur on a year round basis, yields a total surface water supply use of 2,499 af/yr. Adding to this the considerable groundwater use in the Sierra Valley estimated at 679 acre-feet in 1981 (DWR, 1983) yields a Countywide water supply use of 3,178 af/yr in 1981. The difference between the DWR ultimate probable use and the 1981 estimate of 722 af/yr suggests that the demand for water supply has not reached the ultimate probable demand estimated by the DWR in 1960. Alternatively, the assumption that the small diversions account for the Countywide water supply usage could be an underestimate.

**Forest Products.** The DWR estimated the probable ultimate demand for forest products use in Sierra County at 400 af/yr. Of this total 200 af/yr was located in the North and Middle Yuba River Unit, 100 af/yr in the Sierra Valley Unit, and 100 af/yr in the Little Truckee Unit.

An inspection of the surface water rights data indicates that there are only 6 water rights on file for milling use, with five located in the Middle Yuba Unit and one in the North Yuba Unit. The combined total flow of these surface water rights is 2.4 cfs, or 856 af/yr if used for six months out of the year, much larger than the DWR estimate of 200 af/yr for the North and Middle Yuba Units. All 6 milling water rights are also designated for other uses, perhaps explaining the difference between the DWR and surface water rights estimates.

An additional forest product use is noted in the Sierra Valley Unit at Loyalton, where the Sierra-Pacific Industries Sawmill used 1,427 acre-feet of groundwater in 1981 (DWR, 1981). This estimate shows that forest products use in the Sierra Valley Unit already exceeds the ultimate probable forest products use of 100 af/yr in the Sierra Valley Unit estimated by the DWR in 1960.

**Irrigation.** The DWR estimated that ultimate probable use of water for irrigation in Sierra County would amount to 133,700 af/yr concentrated in the Sierra Valley, Little Truckee, and Herlong Units. In the Sierra Valley Unit, the DWR (1983) estimated that agricultural usage of water amounted to 75,600 acre-feet in 1981, in relatively close agreement with the ultimate probable use estimate of 81,800 af/yr. This suggests that land use patterns in the Sierra Valley Unit have developed as projected by the DWR in 1960.

In the Herlong Unit, where surface water rights are designated primarily for irrigation, a total of 27.6 cfs of diversion rights are on file with the SWRCB, equivalent to about 9,900 af/yr if used for six months out of the year, which is less than the DWR estimate of 14,900 af/yr. In comparison, if irrigation were



to be practiced for nine months out of the year the surface water rights would amount to about 14,800 af/yr, roughly equivalent to the DWR estimate.

In the Little Truckee Unit, the DWR (1960) estimate of 30,000 af/yr irrigation use may have included agricultural operations in the Stampede Valley, which ceased in 1969 with the construction of Stampede Reservoir in 1969.

**Recreation.** The Sierra County probable ultimate recreational use was estimated at 2,700 af/yr concentrated in the North Yuba Unit by the DWR (1960). This estimate was derived from the number of summer residences, motels and resorts, camps and campsites in the County multiplied by unit values of use to obtain total water usage.

**Marsh and Reservoir Evaporation.** DWR (1960) estimated that marsh and reservoir evaporation would probably ultimately amount to 10,400 af/yr in Sierra County concentrated in the Little Truckee Unit. This estimate is probably low because it does not include the evaporation from the Stampede Reservoir which became operational in 1969, and from the Jackson Meadows Reservoir which became operational in 1964.

**Fish and Wildlife.** Instream water can be appropriated, and therefore used, for fish and wildlife. Instream appropriations are imposed by CDFG on diversion water rights, requiring that a minimum flow is maintained below the point of diversion for fish and wildlife use downstream. There are a total of 14 instream flow requirements related to diversions in Sierra County (Table 8-11).

Three of the instream flow requirements are in the North Yuba Unit, one in the upper reaches of the North Yuba River in the North Yuba River watershed and two in the Little Fiddle Creek watershed on small creeks.

In the Middle Yuba Unit there are five instream flow requirements. Two of these instream flow requirements are on Marion Creek, a small watercourse in the Oregon Creek watershed of the Middle Yuba Unit. Three of the instream flow requirements are associated with the water diversions of YCWA at Our House Dam and YCWA at Milton and Jackson Meadows, respectively. NID is required to allow 5 cfs or the natural flow to bypass Jackson Meadows throughout the entire year, and 3 cfs or the natural flow to bypass Milton Reservoir at all times. YCWA is required to release a minimum of 30 cfs or the natural flow at Our House Dam, increasing to 50 cfs between April 15 and June 15. These requirements often curtail diversions during summer months.



**Table 8-11  
INSTREAM FLOW REQUIREMENTS**

<b>Identity Number</b>	<b>Stream Name Water Rights Applicat # License #</b>	<b>Location Agreement Date</b>	<b>FERC Proj #</b>	<b>Diversion Name Water Rights Applicant</b>	<b>Minimum Instream Flows Under Agreement</b>
<b>North Yuba Unit</b>					
A10.E3-1	Grants Ravine 18470 L09754	SE¼ of SE¼ S20, T19N,R9E,MD 01/12/59	—	— Diablo Gold, a Partnership	At all times bypass ≥ 2 cfs or n.f. whenever flow is less than above
A10.E3-2	South Fork Indian Cr 18470 L09754	S20,T19N,R9E,MD 01/12/59	—	— Diablo Gold	At all times bypass ≥ 3 cfs or n.f. whenever flow is less than above
A10.E4-1	North Yuba River 26408	SW¼ of NE¼ S11, T20N,R12E,MD 06/06/80	—	— John L. & Patricia B. Winther	Comply with Fish and Game Code Section 5937
<b>Middle Yuba Unit</b>					
A10.D1-2	Middle Yuba 15574	S20,T18N,R9E,MD 09/02/65	2246	Hour House Diversion Dam Yuba Co. W.A.	Apr 15-Jun 15 50 cfs or n.f. Jun 16-Apr 14 30 cfs or n.f.
A10.D1-4	Marion Creek 18011	SW¼ of NE¼,S32, T19N, R9E, MD 02/21/58	—	— Loma Linda University	At all times bypass ≥ 1 cfs or n.f. whenever flow is less than above at the point of diversion
A10.D1-5	Marion Creek 14274 L06643	NE¼ of ¼ S32, T19N, R9E, MD 11/09/54	—	— Edward Kohler, Alice Hill	At all times bypass ≥ 1 cfs or n.f. whenever flow is less than above at the point of diversion
A10.D2-1	Middle Yuba 20072	S12,T19N,R12E, MD 05/10/63	2266	Milton Diversion Nevada I.D.	3 cfs or n.f. whichever is less
A10.D3-2	Middle Yuba 20072	S18,T19N,R13E, MD 05/10/63	2266	Jackson Meadows Reserv. Nevada I.D.	5 cfs or n.f. whichever is less



**Table 8-11(Cont)**  
**INSTREAM FLOW REQUIREMENTS**

<b>Identity Number</b>	<b>Stream Name Water Rights Applicat # License #</b>	<b>Location Agreement Date</b>	<b>FERC Proj #</b>	<b>Diversion Name Water Rights Applicant</b>	<b>Minimum Instream Flows Under Agreement</b>
<b>Sierra Valley Unit</b>					
A11.C4-1	Bear Valley Creek 23444	SW¼ of SW¼ S19, — T21N,R16E, MD 04/03/72	—	— Occidental Land Company	At all times bypass ≥ 2 cfs or n.f., whenever flow is less than above, at the points of diversion
A11.C4-2	Bonta Creek 23924 L10760	NW¼ of SE¼ S24, — T20N, R14E, MD 11/18/71	—	— San Francisco Bay Council, GSA	At all times bypass ≥ 1 cfs or n.f. whenever flow is less than above
A11.C4-3	Smithneck Creek 23443	SW¼ of NW¼ S29, — T21N, R16E, MD 04/03/72	—	— Occidental Land Inc.	At all times bypass ≥ 8 cfs into Smithneck Cr, or n.f., whenever flow is less than above, at the point of diversion
<b>Hydrologic Unit G0700 - Little Truckee River</b>					
G07.00-1	Little Truckee	S28,T19N,R17E, — MD	—	Stampede Reservoir U.S.B.R.	Sep 30-Mar 30 15 cfs Apr 1-Apr 15 75 cfs Release of 30 cfs year round for Boca Reservoir
G07.00-2	Perazzo Canyon 22266	NE¼ of NE¼,S17, — T19N, R15E, MD 06/28/67	—	— Mt. Lola Development	Apr 1-Jun 1 ≥ 10 cfs and at all other times bypass ≥ 5 cfs or n.f. whenever flow is less than above at the point of diversion
G07.00-3	Unnamed Trib. to Webber Lk 21955 L09692	NE¼ of SE¼, S20, — T19N, R14E, MD 11/10/64	—	— Jean Pierre Broderre Velma C. Clark	Dec 15-Jun 30 ≥ 1.5 cfs or n.f. whenever flow is less than above

SOURCE: DWR 19082, pp. 135-139, 285.



In the Sierra Valley Unit there are three instream flow requirements on three streams at their point of entry to the valley. On Bear Valley Creek a minimum of 2 cfs or the natural flow, on Bonta Creek 1 cfs or natural flow, and on Smithneck Creek 8 cfs or the natural flow must remain in the stream at all times.

Finally, in the Little Truckee Unit there are three instream flow requirements. The largest is on the Little Truckee River at Stampede Reservoir where a minimum of 30 cfs must be released for use in Boca Reservoir, with an increase to 75 cfs during the period between April 1 and 15. Additional instream flow requirements are attached to Perazzo Canyon with a minimum flow of 5 cfs or the natural flow with an increase to 10 cfs between April 1 and June 1, and an unnamed tributary to Webber Lake with a minimum flow of 1.5 cfs or the natural flow between December 15 and June 30

**Stream Diversions and Impoundments: Environmental Effects**

As discussed above, the principal motivations for diverting or impounding water in Sierra County have been agricultural water use and energy production. In general, agricultural diversions are well established and consist of a series of ditches and canals in Sierra Valley. In general, the ongoing minor modifications and maintenance of these ditches and canals does not create significant water quality impacts.

Larger scale diversions and impoundments on natural streams for hydroelectricity can create financial benefits for the County, but also have the potential for significant environmental effects on riparian habitat. These issues are discussed in the Energy Element.

One potential method to offset the environmental effects of any water diversions, impoundments or other facilities which are undertaken for local water supply, is for the various water companies to include the cost of environmental mitigation in the fee being charged customers. This approach has been advocated on a State-wide level as partial rationale for State Water Use Fees. Local water companies probably cannot charge customers for the water itself, since the State is the legal owner of all water in California (Allen, 1992), but the companies can charge fees to offset the costs of water development, including mitigation. The County could play a role in alerting the companies to this possibility.

**Economic Development Potential** **Water Rights Availability for Economic Uses** ~ Based on the previous discussion of water rights, it appears that the County's water resources are almost fully developed. Surface water in the eastern portion of the County



(Sierra Valley, Little Truckee, and Herlong Units) have either been adjudicated or specified by federal legislation, making the availability of additional water rights doubtful. Surface water in the Middle Yuba Unit is also probably fully allocated as evidenced by the degree of water resources development. The North Yuba Unit may have additional surface water rights, although this appears doubtful based on a simple calculation of quantities leaving the County and committed to downstream uses, although smaller projects may still be possible. Groundwater in the Sierra Valley is fully developed as evidenced by the creation of a special management district, the SVGWMD, to deal with problems of overdraft.

The only areas of additional water resources development appears to be groundwater in the Herlong Unit and in the volcanic deposits (TQv) of the western part of the County which are sometimes water-bearing (Figure 8-2). A program of exploration could be undertaken in these two areas. Also, the DWR once suggested the Sheep Camp Project in the western Sierra Valley which has never been developed, this project could be explored again. Additional development of non-consumptive uses such as hydroelectric, recreation and fish and wildlife may be possible throughout the County, and could be further investigated. Finally, the County could request an adjudication of surface water rights in the North Yuba Unit in an effort to determine whether excess water exists. However, adjudication is an expensive and time consuming legal process if fully pursued.

**Bottled Water** ~ With respect to development of a bottled water industry it appears that there is sufficient quantity and quality of water resources in the County for development of a bottled water use, provided that the volume of water consumed is relatively small. It is estimated that the minimum economical size of a bottled water plant would consume about 7,600 gpd (equivalent to 0.01 cfs or 63 af/yr) of water. This small quantity could be obtained from surface water in the western part of the County based on the number of present water rights of this size and the relatively large flows in the rivers. In addition, the surface water is of good quality and is therefore probably marketable.

Well water (groundwater) of the County probably cannot be marketed because consumers could not be attracted due to the mineral content and lack of attractive source. At the present, most commercially successful bottled waters are from springs or mountain streams.

**Recreational Use of Water** ~ Augmentation of the existing recreational use of water resources is possible throughout the County, especially since the water is not consumed, leaving it available for downstream uses. Additional



water rights for fish and wildlife, directly related to recreation in Sierra County, is a definite possibility if the necessity of additional requirements for fish and wildlife and/or a historic pattern of use can be established. The recent challenge of the YCWA water rights on the Yuba River by the CDFG illustrates the state of California's interest in protecting fish and wildlife resources. The development of recreational uses of water raises the potential problem of conflicting recreational issues. Some of the traditional types of water recreation generate substantial amounts of noise and safety conflicts with more passive forms of recreation. This is primarily the case on lakes where speed boats and jet skis can conflict with fishing boats and canoes, can create noise affecting the backcountry experience for hikers, and can cause water pollution.

Another recreation issue is access to water features. Since water features are a recreational asset, public access will need to be maintained if further recreational potential is to be realized. However, public access can conflict with private property rights as evidenced by ongoing complaints about privacy loss and litter.

## **Exportation of Water**

**Agricultural Water Use vs Exportation** ~ The major agricultural region of Sierra County is the Sierra Valley. Groundwater in the Sierra Valley is now managed by the SVGWMD which can attempt to "conserve" water, effectively limiting pumping by imposing a pump tax on the users. However, the largest users of groundwater are already agricultural, so conservation would probably begin with agriculture. Conservation measures recommended by the DWR (1983) should be considered to encourage conservation of the Sierra Valley groundwater resources (Appendix B).

With respect to limiting sale of Sierra County water resources to Nevada it seems unlikely in that the areas in closest proximity (eastern Units of Sierra Valley, Little Truckee, and Herlong), and therefore greatest desirability to Nevada, have water available for sale due to the adjudications, federal legislation, and special legislation for groundwater management. It may be possible for Nevada to purchase water from existing water rights holders, but this is a legal question beyond the scope of this report.

Groundwater could theoretically be purchased by Nevada from Long Valley landowners, but the magnitude of these resources is uncertain. An investigation of Long Valley groundwater could be conducted by Sierra County to determine the importance of these groundwater resources if this issue is important. An attorney could be consulted to ascertain the legality of a County ordinance to restrict export of groundwater to Nevada. It is possible that the



principal of "Area of Origin" may be applied to groundwater in order to limit transfer, but this has normally been applied to surface waters.

**General water rights and exportation considerations** ~ Water cannot be kept in the County under California water law unless it is put to beneficial use. Additional use in the County must be developed to keep water from appropriation by others. Based on the water rights inventory it appears that most of the surface water in the County has already been appropriated by County and downstream users. However, there could be some unappropriated waters, particularly in the North Yuba, and the County could initiate a study and/or request an adjudication of the North Yuba River by the SWRCB to ascertain any existence of unappropriated water.

Additionally, there may be water rights in the County that are not on file with the SWRCB. The County could implement a program to urge all users to file for water rights that are not already documented by the SWRCB.

## **Water Supply**

**Water Needs** ~ With continued growth of Sierra County, demand for water by commercial (industrial) and domestic users will grow. The availability of additional water will depend on where the growth occurs (see Public Facilities Element). In the North Yuba Unit there may be some additional water available for smaller projects such as domestic and light industrial use. In the Sierra Valley Unit any additional growth would probably be offset by a decrease in agricultural use because of finite water supplies. Water use in Sierra Valley reached the probable ultimate supply as estimated by the DWR in 1960 and verified by the DWR water use study of 1983. Additional water resources do not appear to be available. Water in the Sierra Valley Unit could probably be purchased from agricultural users for additional growth if necessary. In addition, the DWR (Appendix B) made recommendations about water resources conservation and management in the Sierra Valley with respect to additional growth that could be implemented by the County in an effort to meet reduce and/or meet the increase in demand.

A possible change which may influence water supply, use, and conservation is the potential adoption of State Water Use Fees. Under this concept, California would charge fees based upon its legal ownership of State water in order to pay for water resource management efforts and environmental mitigation, and possibly to raise revenue. The State could require local water purveyors to collect the fee (Allen, 1992). If this type of fee is enacted, climbing water rates could alter water use characteristics and change the projected water demands discussed in the Public Facilities Element.



## **Groundwater**

**Role of Groundwater Districts ~** Recognition of groundwater districts is important in planning and has been undertaken by the DWR on a statewide level resulting in the definition of the Sierra Valley Groundwater District (SVGWB) and Long Valley Groundwater District (LVGWB). Outside of these two areas, groundwater districts that should be recognized on a local level are the valleys and canyons of the County, the upland ridges composed of basement rocks, and perhaps the upland regions with volcanic deposits that are sometimes water-bearing. Recognition of the differences in the groundwater resources of different districts would be beneficial in making planning decisions. However, outside of the SVGWB very little is presently known about the characteristics of the other groundwater "districts" that would be of assistance to planners.

**Viable Water Use Criteria.** Viable water use criteria are established by state law through the water rights system. The Sierra Valley Groundwater District has the authority to establish a form of water use criteria in managing the groundwater of Sierra Valley. Other mechanisms for imposing water use criteria are a legal issue.

## **Growth Inducement**

**Use of Lake Water ~** The use of lake waters for domestic purposes is limited by downstream water rights. Water cannot be diverted from lakes without a right to the water. If rights exist to lake waters then growth is possible. Based on the water rights analysis above it does not appear that large quantities of water are available for future users, which should limit growth around lakes. In addition, the use of lake water generally requires the construction and operation of a relatively expensive treatment system for removal of bacteria and dissolved solids to meet state water quality criteria prior to use, making development more difficult.

## **Geothermal Use**

**Geothermal Potential ~** The geothermal potential of Sierra County has been investigated on a statewide level by the California Division of Mines (CDM) and on a local level by the Department of Water Resources (DWR). The CDM has stated that geothermal waters of Sierra County are not suitable for power generation, but could be used for heating. The DWR delineated the known areas of the Sierra Valley with thermal wells. Additional investigations are usually left to private enterprise. Sierra County could investigate use of geothermal resources for heating County offices in Sierra Valley. Alternatively some form of economic inducement could be offered to private enterprise. (Also see 15. Energy Element)



**Geothermal Impacts ~** The potential for impacts from geothermal use on groundwater levels and quality in Sierra Valley is unknown. Based on the data collected from agricultural pumping it appears that groundwater pumping for geothermal use might cause a lowering in groundwater levels. The SVGWD is in the best position to ascertain the effect of geothermal use on groundwater levels and quality.

A geothermal impact related to groundwater withdrawal is subsidence. Subsidence is the settling or sinking of the ground surface, often due to the extraction of gas, oil, or water. Subsidence due to domestic and irrigation wells is possible.

Another impact of geothermal use is related to disposal of the relatively poor quality water after the heat has been removed. It is possible that a subsequent use could be found for the water. Often the water is re-injected into the formation from which it is recovered. Some mechanism of disposal must be found or development of the geothermal resources could be inhibited.

## **Surface Water Quality**

In general, the quality of surface waters in Sierra County is good, suitable for most uses (Sierra County, 1987). Typical characteristics are soft, low alkaline water with low concentrations of dissolved solids, suspended solids, and trace organics, as well as high concentrations of dissolved oxygen (Sierra County, 1987). Water quality analyses for various locations in and near Sierra County are presented in Appendix A.

The sections which follow focus on the principal local concerns: erosion and sedimentation, and septic systems. Hazardous materials, mining, landfills, underground storage tanks, and agricultural runoff are also discussed.

**Erosion and Sedimentation: General Causes ~** In Sierra County, one of the principal causes of erosion and sedimentation is inadequate stabilization of unpaved roads. One indication of the prominence of roads in watershed effects is the analysis of the *Tahoe National Forest Land and Resource Management Plan EIS* which utilizes the concept of "Equivalent Road Acres (ERA)" as explained in the excerpt below

ERA - Equivalent Road Acres. ERA is the conversion of acres of various types of land disturbance to a standard base. Since roads are assumed to cause the maximum impacts to the land, it is the chosen unit of equivalency and is assigned to the value of 1.00 (one acre of road disturbance equals 1.00 ERA). Other types of disturbances would result in impacts less severe than roads and are assigned fractional values from zero to 1.00. For instance, an ERA coefficient of 0.30 might be assigned a tractor clearcuts. Using this coefficient, ten acres of tractor clearcut



results in a disturbance comparable to three road acres. The average forestwide ERA value for the 1977-1987 period is estimated at 17,200, of which 11,400 is attributed to roads.

Erosion from roads can occur from poorly installed erosion control measures, poor maintenance, and the effects of off-road recreational vehicle use. Any unpaved road surface can erode, regardless of whether it is a County road, a Forest Service road, or a road constructed as part of a Timber Harvest Plan. A common problem in the past has been unauthorized use of logging roads on public and private lands.

In addition to road-related erosion, other causes of erosion in the County may include improper timber harvest practices, excessive grazing in stream corridors, and poorly reclaimed mining sites. Erosion from development sites has not been a substantial problem in Sierra County because of the lack of major subdivision or large commercial or industrial sites.

Erosion control measures are required for timber harvests on public and private lands, but it has been asserted that significant erosion is occurring as a combined effect of multiple timber harvests. One local observer cites the following statistic as evidence of these cumulative erosion impacts:

... 32,000 non-federal grazed and timbered Sierra County acres were reported in 1984 by the U.S. Soil Conservation Service to be experiencing excessive soil erosion (as reported in *California's Forests and Rangelands: Growing Conflict Over Changing Uses*, Forest and Rangeland Resource Assessment Program (FRRAP), California Department of Forestry and Fire Protection.

This statistic implies that timber and/or grazing uses are a cause of the excessive erosion. However, the precise causes are not identified in the report.

Other evidence cited for cumulative erosion and sedimentation problems is the 1977 Sierra County Wildlife Element identification of several streams degraded by sediment. Within the text discussion, timber harvest is cited as a factor in the sedimentation of a dozen stream segments (p. 50-96).

The 1977 Wildlife Element also contains an inventory of County streams and fishery habitat; Table 8-12 presents the information from that inventory concerning stream conditions and development constraints. Of the 151 streams listed, 41 were classified as either "substantially altered" or "severely degraded", with 13 in the latter category. The cause of the degradation



**Table 8-12**  
**SIERRA COUNTY STREAMS ONCE CLASSIFIED AS DEGRADED**

<b>Stream</b>	<b>Stream Miles<sup>1</sup></b>	<b>Stream Condition<sup>2</sup> / Cause</b>	<b>Development Constraints<sup>3</sup></b>
Antelope Creek	5.0	Severely degraded	Highly erosive soils
Balls Creek	6.0	Substantially altered	N/A
Campbell Gulch	1.5	Substantially altered/ Mining	Highly erosive soils
Carman Creek	6.0	Severely degraded/ Siltation and turbidity	N/A
Charlotte Creek	3.0	Substantially altered/ Bank erosion	Fragile meadows, Highly erosive soils
Cold Stream (upper sec)	7.3	Substantially altered/ Bank erosion	Riparian vegetation
Dark Canyon (trib. to Lemon Canyon)	2.5	Severely degraded/ Forest fire	N/A
Davies Creek	1.5	Severely degraded	Riparian vegetation
Deer Creek	4.0	Substantially altered/ Stream channelization or bank alteration	Riparian vegetation
Dodge Canyon	2.0	Substantially altered/ Forest fire	Highly erosive soils
Dog Creek	5.0	Severely degraded	Riparian vegetation
Empire Creek	5.5	Substantially altered	Steep or unstable slopes
Eureka Creek	2.0	Severely degraded	Steep or unstable slopes
Evans Canyon	5.0	Severely degraded	Highly erosive soils
Frazier Creek	8.0	Substantially altered	Steep or unstable slopes
Gale Creek	1.5	Substantially altered	N/A (Cont.)

Notes: Streams classified in the 1977 Wildlife Element as "relatively undisturbed to pristine" and "slightly affected" are not included in this table.

<sup>1</sup>Stream miles is the length of stream containing known fish population.

<sup>2</sup>The stream condition rating of the wildlife Element focuses on habitat deterioration with six potential causes: 1) stream channelization or bank alterations; 2) flow depletion; 3) bank erosion; 4) siltation or turbidity; 5) mining; 6) forest fire.

<sup>3</sup>Development constraints are noted where "streamside construction or development could seriously damage stream environments." Constraints include: 1) fragile meadows; 2) riparian vegetation; 3) steep or unstable slopes; 4) highly erosion soils; NA-Not available.

SOURCE: Sierra County 1977 Wildlife Element, DFG, pp. 107-117.



**Table 12 (cont.)**  
**SIERRA COUNTY STREAMS ONCE CLASSIFIED AS DEGRADED**

<b>Stream</b>	<b>Stream Miles<sup>1</sup></b>	<b>Stream Condition<sup>2</sup> / Cause</b>	<b>Development Constraints<sup>3</sup></b>
Goodyears Creek	5.0	Substantially altered/ Mining	Steep or unstable soils
Haskell Creek	2.5	Substantially altered	N/A
Hoke Creek	3.0	Severely degraded	Riparian vegetation
Howard Creek	3.3	Substantially altered	N/A
Kanaka Creek	12.0	Substantially altered	Steep or unstable slopes
Ladies Canyon, Little	1.7	Substantially altered	Steep or unstable slopes
Lemon Canyon	3.5	Substantially altered	N/A
Long Valley Creek (trib. to Honey Lk)	4.0	Severely degraded/ Bank erosion, siltation	Riparian vegetation, Highly erosive soils
Lucky Dog Creek	2.0	Substantially altered	N/A
Marion Creek	1.5	Substantially altered	Highly erosive soils
Merrill Creek	5.0	Severely degraded	Riparian vegetation
Miller Creek	1.2	Substantially altered	Steep or unstable soils
New York Ravine	1.4	Severely degraded/ Silt or turbidity	Steep or unstable slopes
Oregon Creek	12.0	Substantially altered/ Siltation or turbidity, Mining, Forest fire	Highly erosive soils
Packer Creek	3.8	Substantially altered	Riparian vegetation
Perazzo Creek	4.0	Substantially altered/ Bank erosion	Fragile meadows

(Cont.)

Notes: Streams classified in the 1977 Wildlife Element as "relatively undisturbed to pristine" and "slightly affected" are not included in this table.

<sup>1</sup>Stream miles is the length of stream containing known fish population.

<sup>2</sup>The stream condition rating of the wildlife Element focuses on habitat deterioration with six potential causes: 1) stream channelization or bank alterations; 2) flow depletion; 3) bank erosion; 4) siltation or turbidity; 5) mining; 6) forest fire.

<sup>3</sup>Development constraints are noted where "streamside construction or development could seriously damage stream environments." Constraints include: 1) fragile meadows; 2) riparian vegetation; 3) steep or unstable slopes; 4) highly erosion soils; NA-Not available.

SOURCE: Sierra County 1977 Wildlife Element, DFG, pp. 107-117.



**Table 12 (cont.)**  
**SIERRA COUNTY STREAMS ONCE CLASSIFIED AS DEGRADED**

<b>Stream</b>	<b>Stream Miles<sup>1</sup></b>	<b>Stream Condition<sup>2</sup> / Cause</b>	<b>Development Constraints<sup>3</sup></b>
Sandusky Creek	1.5	Severely degraded/ Siltation or turbidity	N/A
Slate Creek	1.0	Substantially altered/ Siltation or turbidity, Mining	N/A
Slate Castle Creek	1.5	Substantially altered	N/A
Smithneck Creek	9.3	Substantially altered/ Stream channelization or bank alteration	Fragile meadows, Riparian vegetation
Turner Creek	4.0	Substantially altered	Fragile meadows, Riparian vegetation, Highly erosive soils
Williams Creek	2.0	Severely degraded	Highly erosive soils
Woodruff Creek	2.5	Substantially altered	Steep or unstable slopes
Middle Fork Yuba River (above Jackson Mead.)	4.0	Substantially altered/ Bank erosion	Fragile meadows, Riparian vegetation
Middle Fork Yuba River (Kanaka Cr to Cnty Line)	6.5	Substantially altered	Steep or unstable slopes

Notes: Streams classified in the 1977 Wildlife Element as "relatively undisturbed to pristine" and "slightly affected" are not included in this table.

<sup>1</sup>Stream miles is the length of stream containing known fish population.

<sup>2</sup>The stream condition rating of the wildlife Element focuses on habitat deterioration with six potential causes: 1) stream channelization or bank alterations; 2) flow depletion; 3) bank erosion; 4) siltation or turbidity; 5) mining; 6) forest fire.

<sup>3</sup>Development constraints are noted where "streamside construction or development could seriously damage stream environments." Constraints include: 1) fragile meadows; 2) riparian vegetation; 3) steep or unstable slopes; 4) highly erosion soils; NA-Not available.

SOURCE: Sierra County 1977 Wildlife Element, DFG, pp. 107-117.



was only infrequently listed — where it was listed, erosion or siltation was a predominant factor (10 streams) and mining and forest fires were lesser factors (3 and 2 streams, respectively). "Highly erosive soils" or "steep or unstable slopes" were listed as development constraints for 20 of the degraded streams; of the 105 streams rated, 76 fell into one of these constraint categories.

While this stream inventory information is not recent (1977) it probably does provide a broad indication of current conditions. According to the Department of Fish and Game Fishery Biologist, John Hiscox, the condition of some creeks may have worsened, but it is not likely that conditions have substantially improved (Hiscox, Personal Communication 3/16/93).

Erosion Hazard maps have been prepared which categorize soils based on their erosion potential; these maps are on file with the Planning Department. Coverage for the entire County is not currently available. For those areas shown, "high" or "very high" erosion hazard is predominant.

**Current Erosion and Sediment Control Practices** ~ The following paragraphs provide a brief overview of the current requirements for erosion and sediment control with an emphasis on timber management. This information is intended to serve as a backdrop to the subsequent discussion of the County's role in erosion and sediment control.

Article 936 of the California Forest Practice Rules (CFPR) addresses watercourse and lake protection for the Northern Forest District (CFPR, February 1991, pp. 70-75):

**§936. Intent of Watercourse and Lake Protection**

The purpose of this article is to insure the protection of the beneficial uses that are derived from the physical form, water quality, and biological characteristics of watercourses and lakes. It is the intent of the Board to restore, enhance, and maintain the productivity of timberlands while providing equal consideration for the beneficial uses of water. Further, it is the intent of the Board to clarify and assign responsibility, to recognize potential impacts of timber operations on the beneficial uses of water, and to adopt feasible measures to prevent water pollution related to timber harvesting.

The Article defines watercourse protection zones, the width of which varies based on slope and type of watercourse as shown in Table 8-13.

The key protection measures identified in the above table are "G", "H", and "I" (see third letter of the three listed in the "Protection Measure" column). These measures are described in the following excerpt from the Article (p. 74):



**Table 8-13**  
**CCR 936.5 PROCEDURES FOR DETERMINING WATERCOURSE AND**  
**LAKE PROTECTION ZONE WIDTHS & PROTECTIVE MEASURES**

Water Class Characteris- tics or key indicator Beneficial Use	1) Domestic sup- plies on site and/or within 100 ft downstream of the operations area and/or 2) Fish always or seasonally pre- sent onsite includes habitat to sustain fish migration and spawning	1) Fish always or seasonally present offsite within 1000 ft downstream and/or 2) Aquatic habitat for non-fish aquatic species. 3) Excludes Class III waters that are tributary to Class I waters.	No aquatic life present, watercourse showing evidence of being capable of sediment transport downstream to waters Class I or II.	Man-made water courses usually downstream established dome agricultural, hydro- electric supply, or other beneficial us
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WATER CLASS SLOPE CLASS (%)	CLASS I WIDTH PROTEC- TION FT MEASURE (see 916.5(d))	CLASS II WIDTH PROTECTION FEET MEASURE (See 916.5(d))	CLASS III WIDTH PROTECTION FEET MEASURE (See 916.5(d))	CLASS IV WIDTH PROTEC FT MEASURE (See 916.5(d))
30	50 BFG	50	BFI See CFH Section 916.4(c)	See CFI Section 916.4(c)
30-50	100 BEG	50	BFI See Section CFH 916.4(c)	See Section CFI 916.4
50-70	150 ADG	100 BFI	See CFH Section 916.4(c)	See CFI Section 916.4(c)
70	200 ADG	150 BFI	See CFH Section 916.4(c)	See CFI Section 916.4(c)

SOURCE: CFPR, February 1991, pp. 70-75.

"G" To protect water temperature and act as a sediment filter strip, at least 50 percent of the overstory canopy shading the watercourse and 50 percent of the understory vegetation present before timber operations, shall be left standing and well distributed within the watercourse and lake protection zone. These percentages may be adjusted consistent with the above standard to meet on-site conditions when agreed to by the RPF and the director.

"H" At least 50 percent of the understory vegetation present before timber operations shall be left standing and well distributed within the watercourse and lake protection zone in order to act as a sediment filter trip. This percentage may be adjusted consistent with the above standard to meet on-site conditions when agreed to by the RPF and the director.

"I" At least 50 percent of the overstory canopy shading the watercourse and/or 50 percent of the understory vegetation present before timber operations may be required to be left standing within the watercourse and lake protection zone in order to protect water temperature and act as a sediment filter strip. This percentage may be adjusted consistent with the above standard to meet on-site conditions when agreed to by the RPF and the director.

Simply put, the timber harvest must retain 50% of the trees and 50% of the understory vegetation within the most sensitive zones, and those harvests



within the least sensitive natural watercourses must retain at least 50% of the understory vegetation.

Other measures restrict the depositing of slash, debris, soil or other material in waters and require the trees be felled away from watercourses (Section 936.3). Section 936.7 specifically addresses soil loss:

**§936.7 Reduction of Soil Loss**

Within the watercourse and lake protection zone adjacent to Class I and Class II waters, areas where mineral soil exceeding 800 continuous square feet in size, exposed by timber operations, shall be treated for reduction of soil loss. Treatment shall be done prior to October 15th except that such bare areas created after October 15th shall be so treated within 10 days, or as agreed to by the director. Stabilization measures shall be included and explained in the THP or other required notices. Stabilization measures shall be selected that will prevent significant movements of soil into Class I and II waters and may include, but need not be limited to, mulching, rip-rapping, grass seeding, or chemical soil stabilizers.

Finally, the Article allows for alternative prescriptions for the protection of watercourses where there is a potential for significant environmental impacts (the precise measures are to be determined on a site-specific basis (Section 936.6)).

The Tahoe National Forest has "Guidelines for Management in Riparian Areas and Streamside Management Zones (SMZ)" (Volume 2, Appendix F of the Tahoe National Forest Land and Resource Management Plan. As in the case of the California Forest Practices Rules, some timber harvest is allowed in stream zones with specified protection practices as indicated in the following policy statement (p. F-1):

**POLICY**

Management in riparian areas and SMZ's will not completely exclude resource management, but will stress the priority for applying special care in order to protect riparian-dependent resources, water quality, and channel integrity. National Forest policy is to give preferential consideration to riparian-area dependent resources over nondependent resources in cases of conflict; therefore, riparian-area-dependent resources will dictate the intensity of management in these areas. The riparian-dependent resource that is most limiting will dictate the amount of activity allowed in riparian areas. Water quality and channel integrity will dictate the amount of activity allowed in SMZ's that exceed the riparian-area boundary and are adjacent to intermittent and ephemeral streams.

Streams are classified as follows (Tahoe National Forest Land and Resource Management Plan EIS, Glossary, page VIII --33):

**stream class**

A classification given to all named drainages or stream channels on the Forest, based on stream size, season, amount of flow, importance as a fishery or water source, and other



characteristics. They range from Class I (largest, most important) to Class IV (small, often intermittent).

Stream zone widths vary based on these classifications, as well as on channel and slope stability and on the type of stream as indicated in Table 8-14 below:

**Table 8-14**  
**GUIDELINES FOR DETERMINING MINIMUM SMZ WIDTHS**

Stability			Minimum Horizontal SMZ Width (Feet) On Both Sides Of Stream		
Stream Class	Stream Channel	Sideslope	Perennial Stream	Intermittent Stream	Ephemeral Stream
I	Stable	Stable	150	75	--
		Unstable	200	150	--
	Unstable	Stable	175	125	--
		Unstable	300	200	--
II	Stable	Stable	100	50	--
		Unstable	150	100	--
	Unstable	Stable	125	75	--
		Unstable	200	150	--
III	Stable	Stable	100	50	--
		Unstable	100	100	--
	Unstable	Stable	100	50	--
		Unstable	150	100	--
IV	Stable	Stable	--	25	25
		Unstable	--	75	50
	Unstable	Stable	--	50	25
		Unstable	--	75	50

SOURCE: Tahoe National Forest Land and Resource Management Plan, Vol. 2, p. F-4.

The Guidelines contain a number of measures for activities in stream zones, such as timber harvest, road construction and maintenance, fuel management, range management, rails and OHV use, fisheries and wildlife management, and others (F-7 to F-11). Among these measures are:

- The retention of at least 80% of maximum July shade potential (A.2)
- Restriction of logging to one side of streams to the extent possible (B.8)
- Exclusion of harvesting equipment outside of stream zones except at designated crossing (B.10)
- Location of roads outside of perennial stream zones and other drainages where alternative routes are available (C.1)
- Location of all new recreation developments and structures at least 100 feet from lakes and perennial streams and at least 50 feet from intermittent and ephemerals (G.1), and others.



Expected timber yields from stream zones are described in the excerpt below (p. F-7):

B. TIMBER/SILVICULTURE DIRECTION

1. Variable-width Perennial SMZ's (including 100-foot riparian zone): Timber yields planned from variable-width perennial SMZ's, which also includes the 100-foot riparian area, are incidental and are limited to cable corridors and road crossings, and activities to benefit riparian-dependent resources.
2. Intermittent SMZ's on Cable Ground: Timber yields will be planned under low intensity management in intermittent SMZ's on cable ground. This is to meet water quality needs as well as to provide for such wildlife needs as movement corridors.
3. Intermittent SMZ's on Tractor Ground: Subject to wildlife needs such as for movement corridors, timber yields may be planned under either high or low intensity management in intermittent SMZ's on tractor ground. Whatever intensity of management is practiced, appropriate SMZ EGC or harvest unit-wide ground cover goals per S&G 55 (maintain soil production), must be attained.
4. Ephemeral SMZ's: Timber yields may be planned under high intensity management in ephemeral SMZ's on all slopes as long as SMZ EGC, or harvest unit-wide groundcover goals per S&G 55 (Maintain Soil Productivity), are attained.  
Note: EGC stands for effective ground cover

The direction for perennial streams in the Forest Plan appears to be more restrictive than that of the California Forest Practice Rules (CFPR) which allow removal of as much as 50% of the overstory canopy shading the watercourse. Similar to the CFPR, the Forest Service guidelines allow for the application of more stringent practices than indicated — an example given is that intermittent SMZ widths could be applied to ephemerals (p. F-3). Also a number of Best Management Practices (BMPs) are listed for timber management (p. E-2).

Among the stream protection measures described above, maintenance of vegetation and groundcover is a key element as indicated in the following excerpt from *Recommendations for Managing Late-Seral Stage Forest and Riparian Habitats on the Tahoe National Forest* (TNF, February 1992, p. 13):

*Sedimentation.* Riparian areas act as buffers and filters of mobile sediments. The abundant and diverse plant communities of intact riparian areas help ensure stream flows that are low in suspended sediments and turbidity. Vegetation and ground cover within and around the riparian zone are important throughout the watershed for the prevention of accelerated sediment inputs to streams. Sediment entering headwater channels travels downstream, compounding sediment inputs in lower stream reaches and creating the potential for negative cumulative effects. Maintaining vegetation and ground cover on small headwater streams, intermittent streams, and ephemeral drainages, as well as perennial streams, greatly reduces the risk of negative cumulative effects of sedimentation on drainage basins.



**The County's Role in Erosion and Sediment Control** ~ Local jurisdictions have traditionally had the most influence on erosion and sediment control in the context of land development projects. One manual available to the County for this purpose is *Erosion and Sediment Control in Developing Areas of the Sierra* (High Sierra Resource Conservation and Development Council, November 1981). The local Resource Conservation Districts are other sources of technical expertise, and can serve as a monitoring entity as well.

The County's past zoning ordinance has required a 100-foot setback from the high watermark of any lake, reservoir, river, stream, or spring for buildings, structures, except where the Planning Commission requires a greater setback. The County uses the State Uniform Building Code to regulate grading activities. Requirements for other BMPs can be established through conditions of approval and/or the conditional use permit process.

The County also has some ability to control erosion from improved roads by cooperating with the Forest Service in seasonal road closures. The County also can control erosion from Roads by proper and regular maintenance, provided that adequate budgets are available.

The County's role in forest management has been advisory and is limited to this role by state and federal laws. However, the County may formalize its position on erosion and other issues by requesting special rules under Article 13 of the California Forest Practice Rules. For example, special rules currently in effect for Monterey County require field review by a qualified hydrologist or erosion control specialist prior to TNP approval in specified watersheds. The State Board of Forestry has also recently approved new rules which could give counties and their citizens a more active role in timber-related water quality issues. These new rules for "Sensitive Watersheds" are in effect but no successful nominations had occurred by March of 1995 (Russ Henly, Planner, California Department of Forestry, Personal Communication, 3/14/95). The concept of the new rule is described in the following excerpt from the draft rules:

#### Sensitive Watersheds

The Board, at a public hearing, shall determine whether nominated planning watersheds are "sensitive" to further timber operations. Classification of a watershed as "sensitive" shall be supported by substantial evidence that a condition, or conditions, exist(s) where further timber operations within the planning watershed will create a reasonable potential to cause or contribute to ongoing, significant adverse cumulative effect(s) on the resources identified in 916.8(a)(3), and as set forth in Technical Rule Addendum No. 2 and that mitigation of such significant cumulative effects requires the application of protection measures not required by the Forest Practice Rules. For all planning watersheds classified as "sensitive", the Board shall identify the specific resources which are sensitive to further timber operations and specific mitigation measures that will provide the necessary protection of the sensitive resource(s).



The nomination process is described as follows:

(a) Nomination Process:

The Director, local, state, or federal agencies and the public may nominate planning watersheds to the Board and shall provide evidence supporting classification of the watershed as sensitive. The nominator shall discuss the effects that further timber operations will have on the specific resources identified in 14 CCR 916.8(a)(3) which are at risk within the nominated watershed and specify those effects not sufficiently addressed under the forest practices rules and discuss the significance of the effects in light of the condition of the resources in areas adjacent to the planning watershed.

Specific information on current and potential erosion, and related effects, must be provided and specific onsite and offsite mitigation measures beyond the current forest practice rules must be described. (nomination procedures are contained in the appendix)

Another tool which is available to owners of smaller parcels (20-999 acres) is the California Stewardship Incentive Program. This Program provides financial assistance to the landowners for a number of activities including reforestation, riparian habitat and fisheries enhancement, and soil and water protection and improvement. "Landowner Forest Stewardship Plans" setting forth the enhancement activities are also eligible for funding.

The County's ability to require erosion control on mining sites rests with Reclamation Plans mandated under the State Surface Mining and Reclamation Act. A discussion of this issue and related policies are contained in the Mineral Management Element, Policies 7-17.

The County also has the theoretical ability to regulate grazing on private lands to control streambank erosion and destabilization. In practice, however, it would be virtually impossible for the County to implement grazing regulations because of the extensive, distributed nature of the activity and the cost of enforcement. Fencing to exclude cattle from stream zones is also impractical due to the high cost of fencing, but it should be encouraged. In general, only intensive and poorly managed grazing causes significant erosion in the County. The County can assist the Agricultural Commissioner's office and/or Resource Conservation Districts in providing technical assistance to help avoid erosion problems.

A final source of erosion raised as an issue is the operation of dredges by prospectors. Excessive displacement of material in sensitive areas can have substantial effects on aquatic habitat. This is an activity which is regulated by the Forest Service on the National Forests and by the Department of Fish and



Game on private lands. As in the case of grazing, the most practical role for the County is in technical assistance.

**Septic Systems** ~ The City of Loyalton is the only community in the County that has a sewer system; that system discharges by spray irrigation north of town. The remainder of County residents and businesses use on-site septic disposal systems.

Environmental health review of proposed septic systems is provided by a State health officer. In many areas, septic system failures have been common occurrences. There is no community within the County where problems have not occurred, clay soils and high groundwater are the most common factors in septic system failures. Problem areas include portions of Alleghany, Downieville, and Sierra City and high groundwater areas around Loyalton, Sierraville, Calpine, and Sattley.

**Potential Future Needs** ~ Community sewer or shared septic systems may become necessary in Downieville, Sierra City, and Sierraville and perhaps other communities in the future. In the interim, minimum residential parcel sizes in all communities should be increased from the current 10,000 square feet (with a public water system) to 1/2 acre to better ensure adequate repair area.

**Fiscal Concerns/Financing Recommendations** ~ See Economic Element – Recommends consideration of Septage Assessment District.

**Agricultural Runoff** ~ The irrigation systems in Sierra Valley are generally designed to make the most use of scarce water resources. However, some of the irrigation water inevitably finds its way back to channels in tiny rivulets (Conrad Lahr, Sierra Valley Water Master, Personal Communication 5/29/92). In general, there appear to be few surface water quality concerns in Sierra Valley. The ranchers in the area and the Water Master indicate that chemical use in Valley agriculture is very limited because of the short growing season, the climate, and the types of crops grown (pasture grasses). The Water Master additionally reports that he continues to observe fish survival in all parts of the system (May 6, 1992, General Plan Update Technical Scoping Session).

**Hazardous Material Spills** ~ Potential water degradation by hazardous materials in the County is most likely to result from mining, water-related recreation, landfills, and underground storage tanks (USTs). Spills of hazardous material associated with transport are generally less severe than the sources of mines, landfills, and USTs, primarily because they are restricted to small volumes at the ground surface. Hazardous material spills along State Routes 49 and 89 have a potential for extreme threats to water quality as these



transportation routes are aligned along major water courses and are headwater areas to major watersheds. Spills can be cleaned up almost immediately by vacuum trucks and excavation. Hazardous spill clean-up teams are dispatched by the State Office of Emergency Services. Local agencies have the ability to establish local clean-up teams usually derived from Fire District personnel. This is a theoretical possibility for Sierra County, but there is no local expertise in hazardous waste clean-up and no apparent funds to develop that expertise. It should be noted that the County has the responsibility to provide oversight of leak testing of Underground Storage Tanks.

**Water Quality Degradation from Mining ~** Mining activities in the County could potentially have an impact on surface water. There are mines at five locations in the County that have been identified in the Sierra County Hazardous Materials Management Plan (HMMP) as potential sources of pollutants (p. 23). Hazardous materials associated with mining in Sierra County are cyanide, mercury, and arsenic.

**Water Quality Degradation from Landfills ~** Landfills are another potential source of hazardous materials impacts on water resources, groundwater in particular. According to the HMMP there are eight closed and one active landfill in the County (pp. 23-24). The constituents of concern are generally associated with household hazardous wastes, with a variety of hazardous materials found in other landfills in California including trichloroethylene (TCE), pesticides, and petroleum hydrocarbons. According to the Sierra County Sanitarian the active landfill has been investigated in accordance with state regulations with no hazardous compounds detected.

**Water Quality Degradation from Underground Storage Tanks (USTs) ~** Finally, USTs are a source of potential impacts on groundwater. The HMMP estimates that a total of 205 USTs are present in Sierra County, with 36 tanks at 12 service stations (existing and abandoned stations), 20 tanks at 6 schools, 5 tanks at industrial sites, 100 tanks at private residents, and 44 tanks at miscellaneous sites including farms, businesses, and maintenance yards. Of these the HMMP estimates that based on statewide averages 17 of the tanks are leaking. The Central Valley Regional Water Quality Control Board has three leaking underground fuel tank cases in Sierra County and one closed site. The constituents of concern at UST sites are petroleum hydrocarbons (gasoline, diesel, benzene, toluene, ethylbenzene, and xylenes). Annual leak testing of tanks is a state requirement administered by the Regional Water Quality Control Board that should reduce occurrence of leaks impacting water resources. Sierra County could obtain lead authority for management of the UST program if this issue is a concern; however, the personnel and funding uncertainties would probably limit the feasibility of this action.



The DWR (1973) located sources of potential degradation of surface and groundwater in Sierra Valley including sewage lagoons, regulated waste dischargers, and gravel pits in addition to previously mentioned landfills and mines (Figure 8-9). If funding became available, Sierra County could conduct a similar mapping on a County basis to identify potential sources. Household hazardous waste products are also a source of potential water quality degradation.

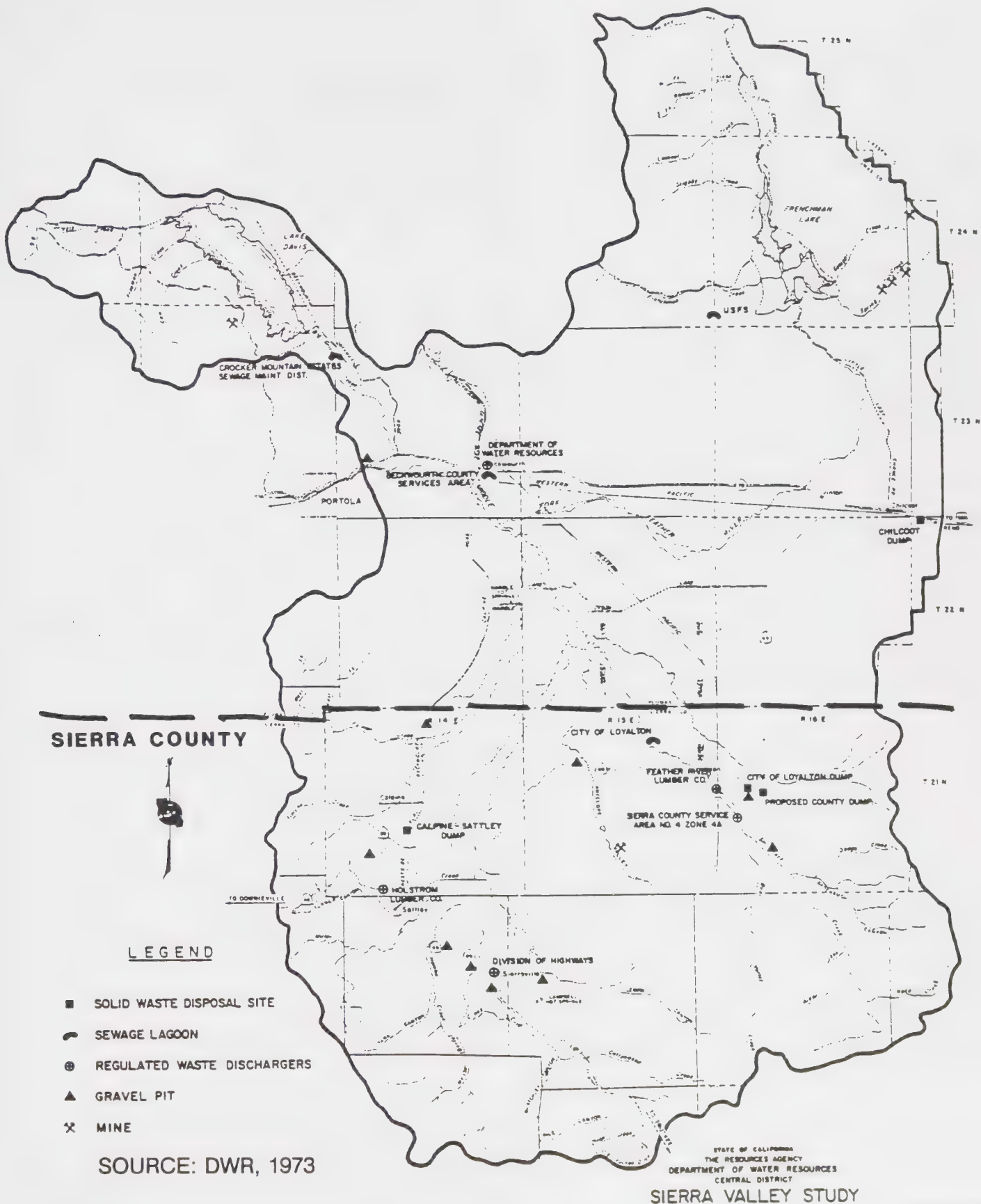
**Hazardous/Nuclear Materials Transport Hazards ~** To address this issue it is first necessary to establish whether nuclear materials are transported through the County. Adoption of a hazardous waste transport notification ordinance might help determine the answer to this issue. Alternatively, a survey of potential nuclear material transporters through Sierra County could be conducted.

The HMMP contains a discussion of transportation systems used for the conveyance of hazardous wastes (pp. 74-75). The railroads in the eastern part of the County transport wastes, and the road system is used by trucks carrying wastes, including those which use Highways 89 and 49 to avoid travelling into the State of Nevada which entails licensing fees.



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According to the HMMP, Section 31304(a) of the California Vehicle Code allows a local agency to restrict or prohibit transportation of hazardous materials and hazardous waste, if certain guidelines are met having to do with safety, proximity to drinking water sources, and availability of alternative routes. The HMMP states that Highway 49, from Yuba Pass west appears to meet these guidelines, but recommends further investigation before a decision is made regarding transport restrictions.

#### **Weather Modification**

**Cloud Seeding** ~ Cloud seeding in a portion of Sierra County along the northern border with Plumas County around Gold Lake is being conducted by the DWR as part of a five year study conducted primarily in Plumas County. An EIR was prepared for this project with no long term impacts identified. The short term impacts identified are land disturbance (erosion) in a small area around equipment installed for the seeding operation and aesthetic effects from helicopter activity and/or facilities construction.

Sierra County is concerned about the potential for cloud seeding to increase snow removal costs and to impact the ecosystem.

#### **Potential Wild and Scenic**

One factor which may have some effect on future water uses as well as on the future condition of County water courses is the consideration of the North Yuba River and various tributaries, as well as other County watercourses, as Wild and Scenic Rivers. The assessment process has three phases:

- 1) Determination of eligibility
- 2) Potential classification (Wild, Scenic, or Recreational), and
- 3) Determination of suitability

The eligibility phase is complete, the classification is nearly complete, and the assessment is about to enter the suitability phase which entails public review and an Environmental Impact Statement (EIS). The EIS is expected to be completed in the Spring of 1995, after which designation may occur.

The following excerpt from the Forest Service/National Park Service pamphlet "Questions and Answers on the Wild and Scenic Rivers Program" briefly explains the Wild and Scenic Rivers Act as well as the three classifications of rivers:

Designation of a river under the Wild and Scenic Rivers Act affords the river certain legal protections from adverse development and provides a mechanism for management of river resources. The principal effect of the Act is to preclude or severely limit the construction of dams



and other water resources projects which might affect the free flowing nature of the river and its other resources. Designation also affects the management of federal lands in the river corridor. Rights to future development of private lands can be purchased under the land acquisition authorities.

Management standards or requirements have been developed for each of the three classifications of Wild and Scenic Rivers — wild, scenic, and recreation. The appropriate classification depends on the level of use in the river corridor at the time of designation. A river may be classified entirely under one category or separate segments of the river may be classified under different categories. The three classifications are briefly described on the following page. [Printed below in this excerpt.]

**WILD** — rivers that are free of impoundments and generally inaccessible except by trail, with watershed or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America. Most of these wild river segments are located on public lands.

**SCENIC** — rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

**RECREATIONAL** — rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The initial classification lists for four Sierra County rivers and eight County creeks is shown in Table 8-15:



**Table 8-15**  
**TAHOE NATIONAL FOREST WILD AND SCENIC RIVERS**  
**ELIGIBILITY LIST - SIERRA COUNTY**  
**August 27, 1991**

**DOWNIEVILLE**

<b>Stream Name</b>	<b>Value</b>	<b>Classification</b>	<b>Mileage</b>
North Yuba River	Recreational Scenic Cultural Fisheries	Recreation	40
Empire Creek	Veg/Eco	Recreation/Scenic	6
Downie River	Veg/Eco	Recreation/Scenic Wild	10 6
Lavezzola Creek	Veg/Eco	Recreation/Scenic Wild	10 5
Pauley Creek	Cultural Veg/Eco	Wild Recreation/Scenic	8 3
Canyon Creek	Scenic	Wild Recreation/Scenic	22 7
Oregon Creek	Cultural	Recreation/Scenic	3
New York Ravine	Veg/Eco	Recreation/Scenic Wild	1 2

**NEVADA CITY DISTRICT**

<b>Stream Name</b>	<b>Value</b>	<b>Classification</b>	<b>Mileage</b>
Middle Yuba River	Scenic	Recreation/Scenic Wild	21 20

**SIERRAVILLE DISTRICT**

<b>Stream Name</b>	<b>Value</b>	<b>Classification</b>	<b>Mileage</b>
Little Truckee River	Veg/Eco Wildlife Cultural	Recreation/Scenic	14
Perazzo Canyon	Veg/Eco Wildlife Scenic	Recreation/Scenic	5
Independence Creek	Veg/Eco Fishery Scenic	Wild	1

Note: The mileage listed in the far right column is approximate.

SOURCE: FOREST SERVICE/NATIONAL PARK SERVICE

The previously cited Questions and Answers pamphlet has the following relevant information on the water use, water rights, and forest/agriculture uses:



**8.Q. What effect will design have on the use of private property?**

- A. Ongoing regular uses of private lands, particularly those existing at the time that the river is designated, are not directly affected. Most private land use such as homes and farms are compatible with Wild and Scenic River management. There is no intent to remove all use, developments or inhabitants from the river corridor. The Management Plan for the river should identify types of land uses and developments which are considered compatible or incompatible with protection of the rivers values.

**13.Q. What effect will Wild and Scenic River designation have on water rights and water development?**

- A. Designation has no effect on existing water rights. At the time of designation, the managing agency will determine the instream flow that is sufficient to maintain the river values — water quality, river recreation, fisheries, etc. Existing water rights may be purchased by the Federal government if necessary to meet the instream flow requirements, or a negotiated agreement with the water users may be prepared to provide for instream flows.

Existing irrigation systems and other water development facilities are not disturbed. Alterations to existing systems and new water projects which require federal permits may be allowed as long as they do not have an adverse effect on the values of the river corridor.

**14.Q. What effect does Wild and Scenic River designation have on timber harvest and agriculture?**

- A. For privately owned lands, timber harvest and agriculture uses are generally unaffected. For Federally owned timber and grazing lands, the Act requires that management of these resources be done in a manner to protect river values.

As indicated, resource utilization will not be eliminated, but is likely to be influenced to some degree. The extent of this influence is likely to be moderated by the potential classification of most of the eligible County water courses as Recreation/Scenic rather than the more restrictive Wild classification

## Related Plans

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### Relationship to Plans

Approximately 3/4 of the County is under the jurisdiction of the three National Forests — Tahoe, Plumas, and Toiyabe. The majority of the National Forest of Sierra County is the Tahoe National Forest. The following excerpts from the "Tahoe National Forest Land and Resource Management Plan" (1990) provide an overview of the approach to water resources management in the Forest.



## **The Land and Resource Management Plan Goals and Desired Future Conditions**

### **SOIL, WATER, AND RIPARIAN AREAS**

1. Produce water of sufficient quality and quantity to meet or exceed identified use requirements and improve water quality by the year 2030.
2. Maintain or improve soil productivity and prevent excessive, cumulative watershed impacts.
3. Conserve soil and water resources and prevent activities that will significantly or permanently impair the productivity of the land.
4. Protect streams, lakes, wetlands, streamside management zones, and other riparian areas

#### **Desired Future Condition**

**Greater emphasis on environmental quality will have positive effects on soil and water resources. Specific riparian and streamside guidelines will have maintained current riparian conditions. Direct soil and water improvement projects will have stopped the decline and in some cases restored or improved the productivity of key watersheds. Instream flow requirements will have protected riparian-dependent communities against incompatible water resource development. Greater emphasis on water resources, soil, and watershed management will have resulted in greater project success and less impact on soil and water resources. Monitoring will provide information on management-induced impacts on soil and water resources. This knowledge will be used to improve project implementation. (V-9).**

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The following excerpt from the *Tahoe National Forest Land and Resource Management Plan* (pages IV-7 to IV-9) gives further indication of how the TNF manages water resources:

Water How should the management of tnf resources respond to the demands and allocations for water quality, quantity, storage, and transmission?

What should be the management emphasis to increase available runoff or to alter timing of flow?

**Resolution** - Because of other resource constraints, water yield increases and changes in timing are incidental to other uses. Increases are a response to other activities, especially timber harvest. Water yield increases and changes in timing are borne out of the FORPLAN analysis for water yield, which showed little potential to increase water yield even in the high-water-yield benchmark. Forest practices allow for some permanent increase in water yield, primarily on low



productivity range sites on the east side of the TNF. The changes in water yield resulting from different resource emphasis are documented in the planning records.

What are the water requirements for on-Forest use for management of resources? What quality standards should be established to meet these requirements?

**Resolution** - Total on-Forest needs are very insignificant compared to total water production from Forest lands. Water quality standards have already been established by the Lahontan and Central Valley Regional Water Quality Control Boards.

To what extent can the TNF respond to increasing off-Forest needs for water, including timing of flows and water quality?

**Resolution** - FORPLAN analysis, through water yield coefficients, shows the changes in water yield with different resource emphasis. The potential for increase is minor and the differences among alternatives are insignificant and would not begin to meet ultimate downstream needs. Water quality is discussed in the above resolution.

How should existing and future water storage projects be used for recreational and fishery purposes?

**Resolution** - This issue has been partially resolved by designating management areas associated with large reservoirs and numerous small lakes. Recreation use and the need for fisheries improvement are identified for these management areas. Existing and future storage projects have been identified in appropriate management areas. Specific prescriptions that recognize recreational and fishery uses have been developed for these areas. In certain specific cases, TNF needs associated with existing water storage projects are subordinate to or in conflict with the operation of these facilities because of prior superior rights or higher downstream needs. Where possible, agreements were made with the water storage facility operator, the TNF, and the California Department of Fish and Game to protect the associated recreation and fisheries opportunities. Similar agreements will be pursued for future projects.

What is the role of the TNF in providing land for future impoundments?

**Resolution** - Future impoundments are evaluated on a case-by-case basis. Specific lands allocated to impoundments are identified in specific authorization bills. The TNF's role is primarily advisory in the selection of such lands and in offering and incorporating mitigation measures where possible to protect fish, wildlife, recreation, and water quality.

What is the TNF's role in providing off-stream storage to meet peak power demands through hydroelectric generation?

**Resolution** - Such project proposals are evaluated on a case-by-case basis. Mitigation measures and specific constraints, such as channel maintenance flow requirements, are normally incorporated into these projects to reduce and minimize impacts to other TNF uses.

How does the TNF assess the instream flow needs with other beneficial uses?



**Resolution** - Instream flow needs are not resolved in the Forest Plan. They will be assessed with the California Department of Fish and Game, such as in the case of small hydroelectric proposals.

What is the fair share of change in water quality to be allocated to on-site National Forest uses versus off-site uses?

**Resolution** - The Best Management Practices (BMP's) developed in response to Section 208 of the Federal Clean Water Act are designed to keep on-site changes within practical and feasible limits. Ongoing monitoring will measure the effectiveness of BMP's in accomplishing these objectives. There is no allocation of water quality degradation to users. Instead, all users must meet standards developed by the Regional Water Quality Control Boards.

To what extent should overall watershed integrity and water quality (cumulative watershed effects) be influenced by TNF activities?

**Resolution** - Forestwide S&G's address the resolution of this concern. Cumulative watershed effect analysis procedures are being refined and are used on a case-by-case basis for small watersheds.

Forest Service management plans have now been partly superceded by new regulations within the Clean Water Act and SWRCB



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**TIMBER  
RESOURCES  
ELEMENT**



**GENERAL PLAN  
2012**









JULY, 1996

## 9. Timber Resources Element

### Background Report

#### Issues

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The following issues were raised at the public General Plan Issues Workshops or at other points during the General Plan process by consultants, staff or Planning Commissioners. While each of these issues may not have resulted in the development of a related policy (as a result of Planning Commission discussion) the list is included here as a record of the full range of concerns discussed.

Key issues are discussed in more detail in the Background Discussion section. The following timber-related issues were raised at the Public Issues Workshops (notes added):

Table 9-1  
SIERRA COUNTY TIMBER RESOURCES ISSUES

**Visual Impacts**

Although the Scenic Highways Update 1978 defines corridors along major highways it does not address timber harvesting on private lands or the State forests which can degrade visual quality.

*NOTE: The scenic corridor was defined in that study as ridgetop to ridgetop along Highways 49 and 89. However, the California Department of Forestry has only recognized a 500-foot corridor in its Timber Harvest Plan mitigation, causing visual degradation in some places.*



## **Visual Impacts (cont.)**

Clearcuts and development in viewsheds are concerns.  
Clear-cuts have been minor but it's still an issue.

## **Jobs/Economic Benefits**

Need for jobs versus view protection are both concerns.

What is the future for the timber industry in Sierra County and its ability to provide jobs?

The County should look into proposals to convert from federal to private lands. *(Note: The Technical Scoping Session members did not think this would necessarily increase sales.)*

## **Environmental Impacts**

Timber harvesting is a concern on a number of fronts: watershed, recreation, private harvest plans, road construction.

Timber harvests masking subdivisions are a problem.

- Look at the timber area especially if it is not zoned TPZ.
- Ensure roads will not be used to justify subdivision development.

The County needs to determine whether timber should be considered an agricultural use relative to accessory uses allowed. *(Note: The Agricultural Technical Subcommittee discussed this issue and recommends that timber not be considered an agricultural use relative to accessory uses allowed but, that equipment storage related to timber operations be allowed on the owner's property only (including any agricultural lands in the same ownership) and that 160 acre minimums be used in Sierra Valley. The Timber Subcommittee additionally recommended owner/operator small operation truck storage at place of residence if on timber land.)*

**The following issues were brought up throughout the General Plan process:**

**Cumulative Impacts** Cumulative impacts of timber harvests should be considered.

**Land Use Conflicts** Urban versus timber harvest land use conflicts are important to consider.

The existing Community Expansion (10-acre lot minimum) areas may create land use conflicts.



## **Reduced Timber Sales**

Reduced USFS timber sales are having an adverse economic impact.

The following issues were additionally raised at the Technical Scoping Session which was attended by Larry Ford, USFS Sierraville Ranger District; Linda Gross, USFS Beckworth Ranger District; Bob Willour, USFS Downieville Ranger District; Roland Shaw, USFS Toiyabe Forest-Carson Ranger District; Tim Feller, Sierra Pacific Industries; Paul Baben, PG&E; Royce Stevens, timber faller; Don McIntosh; Supervisor Lenny Gallegos.

## **Timber Sales Reductions**

Environmental Review Procedures and environmental concerns in general have been slowing down sales processing particularly in the National Forest. However, it does not appear that the process can be sped up since the NEPA process is well ingrained into federal projects. An EIS is prepared on each overall sales program and Environmental Assessments are prepared for individual sales within the overall program. The County can provide input into each document though the Environmental Assessment procedure is less "input friendly".

The State Timber Harvest Plan is faster, however, the short 35 to 45 day review period makes County and public input difficult. (EIRs are not required of Timber Harvest Plans, they are intended by the State to be the functional equivalent of the CEQA process, generally equivalent to a mitigated negative declaration.) There is some public sentiment against CDF because of this short review period and because of perceived past harvest practices allowed. This perception can cause delays in the process as a result of appeals.

On the other hand, small operators often appear to be overwhelmed by the Timber Harvest Plan procedure which may be affecting harvest quantity. CDF is attempting to approve certain small landowners exemptions by the end of 1992 to address this problem.

A related concern is the fact that the environmental review process time can reduce the value of salvage timber which generally should be harvested quickly.

## **Timber Production Zones/ Conversion of Timber**

Timber lands are being converted to Williamson Act rather than Timber Production Zone because the Williamson Act process is faster (because a rezone is not required). The concern is that the original



intent of TPZ legislation is not being met and that the strict confines of a TPZ contract may not be met by a Williamson Act contract.

There will continue to be pressure to convert timber lands to other uses, particularly the less productive lands. However, every piece of timber land has a sustained yield rate and piece meal conversion of even the slower growing timber lands could cumulatively impact the timber industry in the County.

The Timber Production Zone (TPZ) may not be entirely effective on its own in preventing timberland conversion.

#### **Incompatible Land Uses on TPZ Land**

State law allows packaging and processing on TPZ lands and the County ordinance follows suit. However, the location of heavy industrial uses which are not tied to the harvest on the land in question is a concern. The LP waferboard plant approval is an example.

#### **Urban Land Use Conflicts/Roads**

Residential land uses conflict with the hauling of timber. Residential projects have been approved in timber access paths with roads which cannot support large trucks. Timber harvest plan proposals then receive residential opposition.

#### **Recreationist Conflicts**

Recreationists using USFS and private forest roads cause erosion and impact erosion control features constructed by timber harvesters.

#### **Environmental Constraints to Logging**

The North Yuba Wild and Scenic River proposals may affect logging in the future. Sivicultural treatments and timber operations may be modified within one-quarter mile of designated wild and scenic rivers.

Much of the northern part of Sierra County may be removed from timber harvest because of spotted owl clusters in this area. The policy document is due out in Summer, 1992.

Other environmental issues and concern for specific species may result in overall reduced timber yield in the Tahoe National Forest over the long-term.



**Jobs**

USFS jobs can fluctuate yearly because in the past funding has been tied to the previous year's timber receipts. This affects the County's economy as well as the processing of future timber sales due to reduced staff.

Additional secondary wood products industry potential may be limited. The type of lumber produced at the Sierra Pacific mill is largely for home building. A possibility would be a truss building operation.

**Sierra Pacific Mill**

Reduced timber sales are affecting the Sierra Pacific mill. According to representative Tim Feller, the mill needs 40 mmbf/year from public forests and an equal amount from private forests including their own properties. According to Mr. Feller, an annual sale of 100 mmbf in the Tahoe National Forest would ensure this supply to the mill. Reduced sales in recent years have depleted the stored "pipeline" timber and, as a result, 1992-1994 may be difficult years for the mill. As of April 1992, the mill has only 6 months log supply "in the pipeline."

Another problem is the fact that the mill is tooled for larger logs and cannot handle many of the smaller logs being cut today which must be milled out of County.

**Erosion**

County roads are often not well maintained for drainage/erosion concerns which can affect timber lands as well as the perception of timber harvest impacts. Timber Harvest Plans generally require reseedling of most road fill and blocking of secondary roads which revegetate until they are needed for another harvest.

The cumulative effects of erosion from multiple timber harvests are not adequately considered under current procedures.

**County Revenues**

Biomass has not been sold on USFS lands in the past and could not be taxed but this policy will change soon.

Increased yield is not the only concern. As timber prices rise, a lesser yield may still support the existing level of revenues and mill jobs. However, there is a lag time between wholesale and retail prices which negatively affects the mill.

**Control Burns**

Whether or not to encourage control burns is an issue. Biomass buildup within the forest is a concern. An out of control fire could seriously impact timber supply. Public/private cooperation would be needed.



In addition, air quality regulations may affect the future of control burns.

The General Plan Guidelines for the Conservation Element list Forests as one of several Mandatory Issues (p.117). Most of these issues are discussed in more detail in the Background text which follows. Some issues which require no further discussion in this Element are not addressed further in the Background text. This is typically the case with issues raised by the Technical Scoping Session, which are accompanied by discussions. Another example, is the issue of erosion caused by recreationalists which is discussed in the Water Resources Element.

## Background Discussion

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### **Timber**

Timber resources in Sierra County are vast. In 1986 there were 441,000 acres of commercial forest land in the County (72% of the total County area). A majority of this acreage (78%) is on U.S. Forest Service lands. 77,000 acres were in Timberland Production Zone in 1986 (93% of all private commercial forest lands); as of June, 1992, this figure had increased to 84,926 acres (Data sheet prepared by Bill Copren, Sierra County Assessor, 6/23/92). The lands zoned TPZ as of June 1992 are shown on the map (Figure 9-1) following this page.

The productivity of the County's timber lands is generally regarded as high. The productivity of the private lands zoned TPZ has been estimated by Sierra County Assessor Bill Copren as follows (Table 9-2):



**Table 9-2**  
**ESTIMATED PRODUCTIVITY OF PRIVATE LANDS ZONED TPZ<sup>1</sup>**

<b>Site Class</b>	<b>Acres</b>	<b>Mean Annual Growth<sup>2</sup></b>	<b>Est. Annual Yield (bd ft/yr)</b>
I	5,481	507	2,778,867
II	18,226	379	6,907,654
III	38,221	263	10,052,123
IV	20,002	162	3,240,324
V	2,996	156	467,376

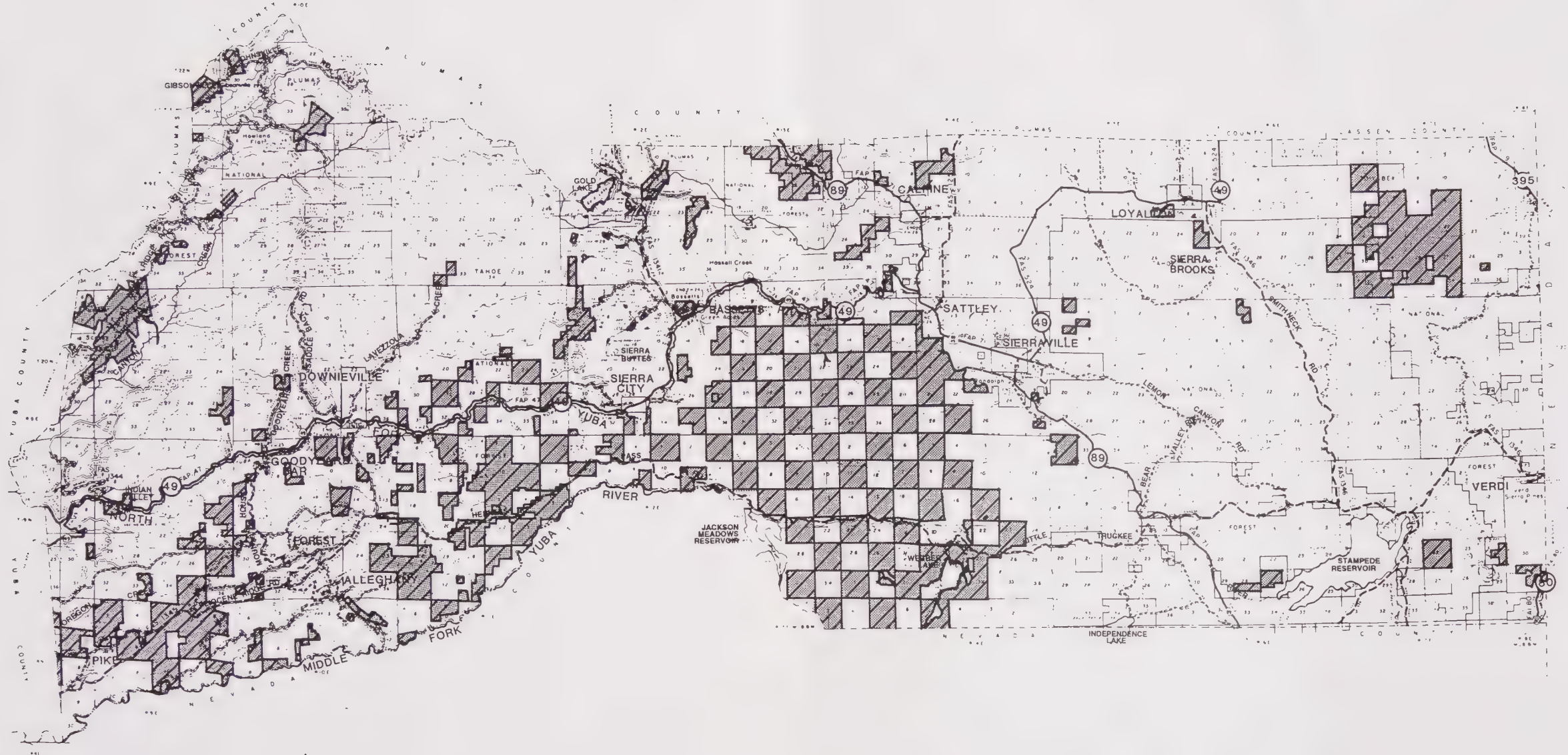
<sup>1</sup> From a 6/23/92 data sheet prepared by Bill Copren.

<sup>2</sup> These figures are averages from nine studies of actual mean annual growth on three federal, three state, and three private forests.



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 SIERRA COUNTY TPZ LANDS

SCALE IN MILES









## Importance of Timber to the Sierra County Economy

Sierra County is one of the most timber-dependent of California counties, and historically, the timber industry has been extremely important to Sierra County's economy and has included logging, lumber mills, trucking, United States Forest Service employment. Employment in timber-related jobs makes up approximately 23% (1989) of the Sierra County labor force directly and perhaps 34.5% additional indirectly (using a Sierra Economic Development District recommended multiplier of 1.5). This has fallen from a high of 403 jobs in 1969 but has remained fairly static since 1981 (25% direct employment in 1981 vs 23% direct employment in 1989). (See Table 9-3).

**Table 9-3**  
**SIERRA COUNTY**  
**TIMBER INDUSTRY RELATED EMPLOYMENT**

Year	Manufacturing <sup>1</sup>		Trucking <sup>2</sup> & Warehousing		Federal <sup>3</sup>		Total		% Total Labor
	Employment Value	Jobs	Employment Value	Jobs	Employment Value	Jobs	Employment Value	Jobs	% (#)
1940	n/a	310	n/a	4	n/a	46	n/a	360	
1950	n/a	204	n/a	2	n/a	45	n/a	251	
1960	n/a	267	n/a	0	n/a	70	n/a	337	
1970	n/a	196	n/a	27	n/a	62	n/a	285	
1980	\$2,795,000	334	\$ 111,000	22	\$ 347,000	47	\$3,253,000	403	% ( )
1981	4,134,000	166	255,000	20	1,607,000	95	5,996,000	281	25% (1103)
1982	n/a	≈142	100,000	16	1,516,000	88	n/a	247	n/a (1033)
1983	n/a	≈142	209,000	11	1,517,000	83	n/a	236	n/a (1055)
1984	n/a	142	318,000	14	1,450,000	72	n/a	228	n/a (1072)
1985	5,208,000	161	276,000	15	1,548,000	72	7,032,000	248	21% (1180)
1986	5,099,000	167	308,000	16	1,586,000	74	6,993,000	257	21% (1214)
1987	5,262,000	164	243,000	16	1,783,000	79	7,288,000	259	21% (1242)
1988	5,731,000	169	279,000	17	1,986,000	78	7,996,000	264	20% (1280)
1989	6,979,000	203	194,000	17	2,129,000	95	9,402,000	315	23% (1353)
1990									
1991									
1992									

<sup>1</sup> Has been reduced by 5% to account for printing and publishing employment.

<sup>2</sup> Has been reduced by 40% to account for other types of trucking.

<sup>3</sup> Some of these jobs may not be directly related to the timber industry.

SOURCE: Sierra Economic Development District 1-823-4703



The Tahoe National Forest Plan estimates "wood products employment" at an even higher percentage of total County manufacturing employment: 44% in 1980. (See Table 9-4)

**Table 9-4**  
**EMPLOYMENT IN THE WOOD PRODUCTS INDUSTRY,**  
**PERCENT OF COUNTY MANUFACTURING EMPLOYMENT AND**  
**PERCENT OF TOTAL COUNTY EMPLOYMENT, SELECTED YEARS**

County	Year	Wood Products- Number of Persons Employed	Wood Products- Percent of Mfg Employment	Wood Products- Percent of Total County Employment
Nevada County	1950	400	73	17
	1970	400	61	11
	1975	400	47	9
	1980	800	44	8
Placer County	1960	700	28	4
	1975	700	40	4
Plumas County	1960	900	98	53
	1970	600	80	32
	1975	700	95	33
	1980	900	91	30
Sierra County	1960	300	100	72
	1970	300	100	72
	1975	200	100	62
	1980	150	99	44
Yuba County	1960	400	61	5
	1970	250	39	4
	1975	700	58	11
	1980	800	66	10

SOURCE: Environmental Impact Statement for the  
Tahoe National Forest Land and Resource Management Plan, 1990. p.3-9.

The total value of direct timber-related employment has fallen when compared in 1989 dollars (see Table 9-5):

**Table 9-5**  
**TOTAL TIMBER-RELATED JOBS VALUE**

	1989 \$
1980 (\$3,253,000)	\$12,638,000
1981 (\$5,996,000)	8,298,000
1989 (\$9,236,000)	9,236,000

(See Table 9-3, above for sources/notes.)



The County has one working commercial sawmill in 1992 (the Loyaltan Mill), a marked decline in number of mills from past decades (see Table 9-6):

**Table 9-6**  
**ACTIVE SIERRA COUNTY SAWMILLS**

Year	Number	Board Ft Produced
1951	11	66,600,000
1962	4	87,000,000
1966	3	73,200,000
1969	2	N/A
1991	1 (160 employees)	109,000,000

SOURCE: 1951-69, Sierra County General Plan, 1970  
1991: Sierra Pacific, 993-4402

Another indicator of change in the timber industry is board feet harvested. By 1992, the number of board feet harvested had fallen approximately 66% from the seven year average for 1985-1992 shown in Table 9-7. This compared to a 25% decrease at the State level.

**Table 9-7**  
**TIMBER HARVEST TRENDS: CALIFORNIA & SIERRA COUNTY**  
**BY CALENDAR YEAR (Board Feet)**

Year	California	Increase/Decrease over Previous Year	Sierra County* Public/Private	Increase/Decrease over Previous Year
1985	3,785,638,000	+5.0%	115,894,000	-26.4%
1986	4,099,271,000	+8%	118,719,000	+ 2.4%
1987	4,430,851,000	+8%	141,420,000	+20%
1988	4,625,000,000	+4.4%	208,177,000**	+47%
1989	4,364,500,000	-5.6%	103,349,000	-50%
1990	3,997,900,000	-8.4%	84,094,000	-19%
1991	3,172,200,000	-20.7%	48,700,000	-42%
1992	2,958,651,000	-6.7%	38,071,000	-22%
1993				
1994				
1995				
1996				
1997				
1998				
Average	3,929,251,000	1992% Decrease from avg: -25%	Average 107,302,990	1992% Decrease from avg: -66%

\* This column represents the quantity of timber cut and scaled. The figures used in this column are from "Species by County" Timber Tax Division table, the total of which differ slightly from those of the "California Timber Harvest by County" table.

\*\* This large volume represents the normal harvest plus the Indian fire salvage.

SOURCE: State Bd of Equaliz., Timber Tax Div., Tbl "Species By County (Rpt YT-35)"; "California Timber Harvest by County" Tbl, Frank Wilson: 445-6964



Trends in harvests on the Tahoe National Forest are indicated in Table 9-8 below:

**Table 9-8**  
**TIMBER HARVEST TRENDS: TAHOE NATIONAL FOREST**

<b>Year</b>	<b>Volume Board Feet Cut by Fiscal Year</b>	<b>Percent Increase/Decrease Previous Years</b>
1984	134,000,000	—
1985	133,000,000	-0.8%
1986	154,000,000	+.16%
1987*	149,000,000	-3.2%
1988	256,000,000	+72%
1989	128,400,000	-50%
1990**	129,200,000	+0.6%
1991	95,300,000	-26.2%
1992	72,600,000	-23.8%
<b>Average</b>	<b>139,055,550</b>	<b>1992% Decrease from Avg: -48%</b>

SOURCES: \* "Tahoe National Forest Land and Resource Management Plan EIS",  
TNF, 1990, p. 3-16.

\*\*Art Umland, Tahoe National Forest, Personal Communication 3/2/92.

Table 9-9 contrasts harvest levels on public and private lands, showing both the respective percentages of the total, and the changes by year. The eight year average shown indicates a substantially higher percentage of harvest from public lands in Sierra County (66%) than is the case statewide for the past decade — 40% ("California Spotted Owl Sierran Province Interim Guidelines Environmental Assessment," USFS, January 1993, p. IV-31). For 1992 the decrease from the average was entirely attributable to harvests on private land. Table 9-9 also shows the large variability in harvest levels from year to year.



**Table 9-9  
PUBLIC AND PRIVATE TIMBER HARVEST LEVELS  
IN SIERRA COUNTY  
(Board Feet)**

Year	Total Sierra County Harvest Levels (Public & Private) (Board Feet)	Sierra County Harvest Levels (Public Lands) (Bd Ft/% of total)	% Incre- ase/De- crease over pre- vious Yr	Sierra County Harvest Levels (Private Lands) (Bd Ft/% of total)	% Incre- ase/De- crease over pre- vious Yr
1985	115,894,000	73,426,000 / 63%	—	42,468,000 / 37%	—
1986	118,719,000	75,463,000 / 64%	+2.8%	43,256,000 / 36%	+ 1.9%
1987	141,420,000	74,396,000 / 53%	-1.4%	67,024,000 / 41%	+54.9%
1988	208,177,000**	163,004,000 / 78%	+119%	45,173,000 / 22%	-32.6%
1989	103,349,000	67,494,000 / 65%	- 59%	35,905,000 / 36%	-20.5%
1990	84,094,000	56,902,000 / 68%	-15.7%	27,192,000 / 32%	-24.3%
1991	48,700,000	23,400,000 / 48%	-58.9%	25,300,000 / 52%	- 6.9%
1992	38,071,000	27,791,830 / 73%	+18.8%	10,279,000 / 27%	-59%
1993	_____	_____	_____	_____	_____
1994	_____	_____	_____	_____	_____
1995	_____	_____	_____	_____	_____
1996	_____	_____	_____	_____	_____
1997	_____	_____	_____	_____	_____
1998	_____	_____	_____	_____	_____
<b>Average</b>	<b>107,302,990</b>	<b>70,234,602/66%</b>	<b>-60%</b> 1992% De- crease from average	<b>37,079,873/34%</b>	<b>-72%</b> 1992% De- crease from average

\* This column represents the quantity of timber cut and scaled. The figures used in this column are from "Species by County" Timber Tax Division table, the total of which differ slightly from those of the "California Timber Harvest by County" table.

\*\* This large volume represents the normal harvest plus the Indian fire salvage.

SOURCE: State Bd of Equaliz., Timber Tax Div., Table "Species By County (Report YT-35)", Frank Wilson: 445-6964

Revenues are received by the County and the school districts from timber harvested on federal lands and from other revenue-producing uses such as recreation. (Timber typically makes up approximately 90% or more of the revenue.) County receipts are allocated proportionally based on the acreage of forest within each county, rather than the amount of timber harvested in each county. In 1991/92 and 1992/93 these revenues were below the nine-year average both in terms of overall dollars and percent of the Sierra County budget as shown in Table 9-10. For example, 1991/92 receipts were 19% below the eight year average (calculated from Table 9-10). While these declines are notable, they are substantially less than the 35% declines in 1992, Tahoe National Forest (TNF) timber harvest levels (calculated from Table 9-8). This distinction between drop in revenues and drop in harvest levels is even more pronounced in the most recent fiscal year: an 8.7% drop in receipts compared to a 48% drop in harvest levels on the TNF (see Table



9-8). Additionally, timber receipts in 1992/93 were up from the previous year in spite of a substantially lower harvest level.

**Table 9-10**  
**FEDERAL FOREST RESERVE RECEIPTS**  
**RECEIVED BY SIERRA COUNTY\***  
**AND COUNTY SCHOOL DISTRICTS**  
**(All Road Fund Money)**

<b>Fiscal Year</b>	<b>County Receipts</b>	<b>% Increase/ Decrease over Previous Yrs</b>	<b>% of County Budget**</b>	<b>% Increase/ Decrease over Previous Years</b>	<b>Total County Budget</b>	<b>School District Receipts</b>
1984-	\$ 899,939	—	16.4	—	\$5,481,77	\$1,124,924
85	561,330	-37.6	9.5	-42.1	5,922,501	701,662
1985-	671,122	+19.6	10.4	+9.5	6,451.183	838,902
86	955,543	+42.4	12.7	+22.1	7,520,928	1,194,429
1986-	1,217,463	+27.4	13.7	+7.9	8,911,990	1,521,829
87	1,437,883	-14.8	10.9	-20.4	9,514,177	1,297,354
1987-	1,037,425	-0.04	11.3	+3.7	9,211,870	1,296,781
88	717,654	-30.8	7.4	-34.5	9,684,481	1,037,444
1988-	801,519	+11.7	8.6	+16.2	9,343,101	1,217,441
89	_____	_____	_____	_____	_____	_____
1989-	_____	_____	_____	_____	_____	_____
90	_____	_____	_____	_____	_____	_____
1990-	_____	_____	_____	_____	_____	_____
91	_____	_____	_____	_____	_____	_____
1991-						
92						
1992-						
93						
1993-						
94						
1994-						
95						
1995-						
96						
1996-						
97						
1997-						
98						
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;"> <b>Average: -8.7%</b>  <b>877,764</b> 1992/93 decrease from average         </div> <div style="text-align: center;"> <b>Average: -23%</b>  <b>11.2%</b> 1992/93 decrease from Average         </div> </div>						

*Notes*

\* Does not include timber yield tax and property tax monies.

\*\* This percentage is based on the total County budget figures which include departments not funded by timber receipts. The percentage of a typical department which is funded by timber receipts is higher than shown.

SOURCE: Sierra County Assessor (916) 289-3283)



## **Environmental Concerns and Timber Management**

Nearly every aspect of forest management has become a point of controversy, including the reason for the declines in harvest levels described above. While it is obvious that the recession and Endangered Species Act considerations are currently slowing harvests, some observers assert that a more fundamental reason for lower harvest levels is that past levels have outstripped the long-term sustainable yield of forests. These observers tend to emphasize environmental considerations, such as cumulative watershed conditions and species diversity.

A major environmental subject that has been raised is that of cumulative watershed conditions. It is being asserted that the combined effect of individual timber harvests has been degradation of watersheds. The following statistics have been cited in support of this viewpoint in Sierra County.

- 32,000 non-federal grazed and timbered Sierra County acres were reported in 1984 by the U.S. Soil Conservation Service to be experiencing excessive soil erosion (as reported in *California's Forests and Rangelands: Growing Conflict Over Changing Uses*, Forest and Rangeland Resource Assessment Program (FRRAP), California Department of Forestry and Fire Protection;
- The 1977 Sierra County Wildlife Conservation Element, prepared by the California Department of Fish and Game, reports timber harvest as a factor in the degradation of a dozen major streams (pp. 50-96). This is discussed further in the Water Resources Element.

The extent to which watershed issues will affect timber harvest levels is unknown.

One member of the public has suggested that the County use the TPZ tax benefit as a means of ensuring that land owners fulfill their land management responsibilities. For example, if a landowner is not properly controlling erosion or restocking their lands, then the County would revoke or suspend the owner's tax benefits. The concept is that this approach could improve soil conservation and timber production. The proponent of this idea uses the 32,000 acre of excessive erosion figure cited above as evidence that site capacity could be improved.

This tax benefit revocation concept is not incorporated into this General Plan because the County apparently does not have the authority to manipulate TPZ and/or its benefits in the manner suggested (Russ Henly, Planner, California Department of Forestry and Fire Protection, personal communication, 3/8/93). The principal means available to the County to influence forest management



are to request Special Rules, and, most recently, to nominate problem areas as "Sensitive Watersheds". The Sensitive Watersheds regulations were passed by the Board of Forestry in October of 1992. The regulations allow public agencies and members of the public to nominate watersheds to the Board of Forestry as sensitive; watersheds so classified will be protected by special mitigation measures. These regulations are discussed further in the Water Resources Element.

Another tool available to improve erosion, improve habitat, and replant stands is the California Stewardship Incentive Program. This program provides financial assistance to owners of smaller parcels (20-999 acres) for the enhancement of forest land; "Landowner Forest Stewardship Plans" setting forth the needed enhancement activities are also eligible for funding.

Biological diversity is another area of environmental concern. This concern has been reflected in the *California Spotted Owl Report* (May, 1992) prepared by the California Spotted Owl Technical Assessment Team and the Forest Service Environmental Assessment "California Spotted Owl Sierran Province Interim Guidelines" (January 1993). The California Spotted Owl Report concurred with an earlier Interagency Scientific Committee Report (April, 1990) that the current forest management strategy would likely lead to the extinction of spotted owls. This strategy included the retention of Spotted Owl Habitat Areas (SOHAs). The subsequent "Interim Guidelines" are expected to result in substantially lower harvest levels than permitted under the management plans for the ten National Forests affected (Region 5). This is discussed further in the subsequent section.

The Tahoe National Forest is also currently conducting the "Old Forest and Riparian Habitat Planning Project" which could have an effect on habitat objectives for future forest planning and thus on timber harvest levels. The project has produced "Recommendations for Managing Late-Seral-Stage Forest and Riparian Habitats on the Tahoe National Forest" (Tahoe National Forest, February 1992) which emphasize a network system centered around riparian corridors which connect large blocks of old forest. Timber harvest is not necessarily precluded in the network, but the management recommendations suggest the retention of large overstory trees, large logs, snags, verticals within stand diversity, and diversity among stands (see Plants and Wildlife Element). The timeline for the final recommendations will run concurrently with the Environmental Impact Statement for the California Spotted Owl Guidelines. At this point it is too early to predict the effects of the project on timber harvest levels (Diana Craig, Tahoe National Forest Wildlife Biologist, Personal Communication, 3/3/93).



A third environmental issue in the works is the consideration of the North Yuba River and various tributaries, as well as other County watercourses, as Wild and Scenic Rivers. (This is discussed in more detail in the Water Resources Element.) The process is about to enter the suitability phase which entails public review and an Environmental Impact Statement (EIS). The EIS is expected to be completed in the Spring of 1995, after which designation may occur. Wild and Scenic River designation applies to a one-half mile wide corridor consisting of a one-quarter mile width on each side of the river. The effect of Wild and Scenic River designation on timber harvest on federal land depends on the provisions of management plans prepared for each river. A Forest Service and National Park Service pamphlet called "Questions and Answers on the Wild and Scenic Rivers Program" states the following:

*14.Q What effect does Wild and Scenic River designation have on timber harvest and agriculture?*

- A. For privately owned lands, timber harvest and agriculture uses are generally unaffected. For federally owned timber and grazing lands, the Act requires that management of these resources be done in a manner to protect river values.

The management of designated rivers will be guided by the standards by which the rivers were evaluated. The standards related to timber for each of the three classification categories are reprinted below:

1. Standards for Wild Rivers

- a. Timber production: Cutting of trees will not be permitted except when needed in association with a primitive recreation experience (such as clearing for trails and protection of users) or to protect the environment (such as control of fire). Timber outside the boundary but within the visual corridor, will be managed and harvested in a manner to provide special emphasis to visual quality.

2. Standards of Scenic Rivers

- a. Timber production: A wide range of silvicultural practices could be allowed provided that such practices are carried on in such a way that there is no substantial adverse effect on the river and its immediate environment. The river area should be maintained in its near natural environment. Timber outside the boundary but within the visual scene area should be managed and harvested in a manner which provides special emphasis on visual quality.

3. Standards for Recreational Rivers

- a. Timber Production: Timber harvesting would be allowed under standard restrictions to protect the immediate river environment, water quality, scenic, fish and wildlife, and other values.



Since most of the river/creek segments of the County are being initially classified as Recreational or Scenic, it appears that some timber harvest would continue to be allowed.

A final environmental issue discussed here is the local concern of visual impacts and timber harvest. Complaints of visual impacts from timber harvest on both public and private lands have occurred, with clearcuts being the focus of attention. Highway 49 is designated a Scenic Highway-Scenic Corridor, with the corridor defined as ridgetop to ridgetop. State Route 89 has a County Scenic Highway designation with a corridor five hundred feet on each side of the road. The California Department of Forestry has considered the scenic corridors in the past to be 200 foot corridors in its review of Timber Harvest Plans. Based on on-going complaints, it is apparent that the broader, adopted corridor should be considered. This is likely to favor cutting techniques other than clear-cutting, and perhaps further influence timber harvest levels.

## **Future Timber Harvest Levels**

**Tahoe National Forest Constraints.** As described above, a variety of environmental considerations is influencing timber harvest levels. According to the Tahoe Forest's Environmental Coordinator and Acting Planner, Bill Baker, the degree to which these factors will affect timber harvest levels is impossible to predict (Baker, personal communication, 9/21/92). As an example of this unpredictability, Mr. Baker described the following situation: A short time after the Tahoe's Land and Resource Management Plan had been adopted, with a target timber output of 142 million board feet (MBF), the Region/Forester directed the Forest to lower the target by 13 MBF as an interim step in considering effects on furbearers. The "California Spotted Owl Sierran Province Interim Guidelines" are a more recent and more significant example. Mr. Baker's rough guess regarding future output is that it may be somewhere around one-half of the historical levels on the Tahoe Forest. According to Mr. Baker, some consider this estimate to be high and others consider it to be low. This figure is consistent with the best guess of other Forest Service personnel; for example, Bob Willour of the Downieville Ranger District ventured that future harvest levels on the Tahoe may be somewhere between 50-100 MBF per year (current production is listed as 149 MBF in Table V-1 of the Forest Plan). These best guesses appear to be reflected by the substantial shortfalls in accomplished sales and target levels discussed in a preceding section.

In any event, timber harvest levels will be affected for a two-year period under the "California Spotted Owl Sierra Province Interim Guidelines". In the Environmental Assessment of those Guidelines, an estimate of annual timber



harvest volumes is 38.5 to 41 million board feet (MBF) for the Tahoe National Forest under the Guidelines (pp. IV-33 - IV-34).

**The Sierra Alternative.** Another major factor influencing future harvest levels on public lands is the level of funding for the Forest Service personnel necessary to prepare and offer sales. For this reason, Sierra County is advocating a new funding procedure called the "Sierra Alternative". The Alternative is described in the following excerpt from the document "The Sierra Alternative, a Position Paper on Constructive Management of the Spotted Owl Timber Crisis".

The Sierra Alternative may be summarized as follows: legislative or administrative regulation amendments will be sponsored to allow individual national forests to add on to the timber sale contracts the cost of complying with environmental standards specified in the Stewart Decision and CASPO guidelines, thus vastly increasing the timber volume which will actually get to the mills and the market -- all within the Stewart Decision guidelines.

Without the Sierra Alternative providing adequate funding measures, even if the appeals and litigation battles are won, the war will be lost. Even without the owl restrictions, there is insufficient money allocated at the forest level to allow processing of sufficient timber volume for mills, with a concurrent detrimental effect on jobs and local economies -- impacting most directly on schools and roads. The Sierra Alternative idea, while apparently new (arising from a meeting held in Sierra County on February 9, 1993), has some precedent in related areas, including salvage sales and land exchanges.

The Sierra Alternative Position Paper estimates that future sales under the alternative could be as high as 65.5 MBF.

**The Quincy Library Group.** Another initiative related to timber management has arisen from discussions between members of the timber industry, of the governments of Lassen, Plumas and Sierra Counties, and of fisheries and environmental groups. These discussions by what became known as the Quincy Library Group were based upon a shared desire on the part of the participants to implement a short-term strategy of forest management on the Plumas, Lassen, and portions of the Tahoe National Forests which would promote forest health, ecological integrity, adequate timber supply, and local economic stability while long-term plans are developed.. Two of the issues upon which the Library Group has reached consensus are listed below (from a paper called "Quincy Library Group - Community Stability Proposal").

- 1) Communities within Lassen, Plumas and Sierra Counties rely upon the forest products industry for education, roads and basic infrastructure. Specifically, the communities of Susanville, Chester, Quincy, Loyalton, Bieber, and Greenville are highly dependent upon



the forest products industry and may not survive the current reductions in Federal timber harvests.

- 2) To promote forest health we believe that three ecosystem management strategies must be implemented simultaneously:
  - i. in order to provide an adequate timber supply for community stability and to maintain a relatively continuous forest cover, a management system using group selection (similar to that proposed by the Friends of Plumas Wilderness in the Plumas NF Land Management Plan or that used at UC's Blodgett Forest) and/or individual tree selection (similar to that employed by Collins Pine) must be implemented immediately.
  - ii. in order to achieve stability in the system the Fire and Fuels management objectives recommended in CASPO must be carried out over the entire landbase.
  - iii. in order to protect fisheries and watershed health a network of riparian habitats and a watershed restoration program must be established throughout those areas managed for unevenage structure. The initial emphasis should include increases in Forest Service appropriations for improvements in range management and road maintenance to restore and protect riparian areas.

These proposals have received attention from federal authorities and may influence timber management in the future.

As in the case of public lands, harvest levels on private land could be reduced by a change in timber management brought about by the California Spotted Owl and cumulative watershed considerations. However, for the moment the State Board of Forestry has made no movement toward a substantial change. In fact a streamlining of procedures for non-industrial lands was just initiated.

During the General Plan Workshops, it was suggested by members of the public that the land base available for timber production, minus the acreage of potential environmental set-asides, be calculated as a basis for establishing realistic timber harvest goals in the General Plan. This approach was rejected for three reasons:

- Decisions regarding forest practices and timber yields are outside of the County's control;
- Data for the suggested mapping is unavailable; and



- It is virtually impossible to predict the location and extent of the set-asides.

Related to the latter point, Tahoe Forest Environmental Coordinator and Acting Planner, Bill Baker, states that the suggested procedure of identifying a land base for timber harvest citing output is rooted in the management methods used until about 1990 which focused on the production of timber. The management methodology which appears to be emerging is a more comprehensive one in which timber is more of a byproduct rather than the principal product (Baker, personal communication, 9/22/92).

Similarly, Raoule Tuazon of the California Department of Forestry's Forest and Rangeland Resources Assessment Program (FRRAP) states that detailed quantification of productivity based on existing data is not feasible; instead of focusing on specific yield targets, he suggests that the Plan focus on economic diversification and target some of the County's timber revenues toward that end (Tuazon, Personal Communication, 5/28/92).

### **The Future of the Timber Industry in Sierra County**

Because of the declining harvest levels, timber industry and County officials are concerned about possible economic effects, including the possible closure of the Loyalton mill, which employs roughly one-half of the County's timber-related employment; with mill closure, timber-related job loss could be 200 or more. This loss would reverberate throughout the economy in both the public and private sectors.

The "California Spotted Owl Sierran Province Interim Guidelines Environmental Assessment" (Forest Service, January 1993) notes a number of economic and social effects of declining timber harvest including the following:

- Sierra County is identified as a timber-dependent community with average unemployment over 10% (p. IV-44)
- Loyalton is shown as one of many sawmill communities affected by the California spotted owl (p. IV-48)
- Direct and indirect employment is expected to be reduced to 584 jobs compared to the base-line reduction to 946 jobs under current procedures (p. IV-49)
- Reduced Forest Reserve Receipts are forecast (p. IV-46)
- Possible effects of reduced employment are discussed which include reduced ability to provide services, to retain a skilled work force and to maintain the overall quality of life that attracts new industries and



recreational visitors (p. IV-50). Stress and related health effects from job loss are noted (p. IV-51)

It should be noted that there are some factors which may allow the mill to stay open, and generally soften the economic effects including the following:

- Potentially competing mills have recently closed in Grass Valley, Truckee, and Sloat
- The Loyaltan Mill is essentially new, having been rebuilt in 1985
- The Loyaltan mill has already diversified to some extent with its cogeneration facilities
- The "Sierra Alternative" may allow higher harvest volumes than projected
- Timber price increases may offset decreasing volumes as described below.

As noted previously, declining harvest levels have not translated in a direct linear way to declining Federal Forest Reserve Receipts. This is due primarily to the accelerated rise in stumpage prices as indicated in Table 9-11 below.

**Table 9-11**  
**PRICE TRENDS IN THE LUMBER INDUSTRY**  
(Calendar Year)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	199
Framing lumber composite index	169	221	199	194	206	229	228	240	229	235	n/
Douglas fir: standard & better 2x4	167	222	202	175	215	227	233	264	215	222	n/
Calif. ponderosa pine #3 x 12	259	251	278	226	252	252	275	323	277	336	n/
Douglas fir plywood 3/8"											
CD ext	135	154	152	150	157	151	152	176	169	172	n/
Stumpage on National Forest (cut timber):											
Douglas fir	\$50.00	\$63.50	\$65.50	\$62.19	\$64.00	\$83.00	\$93.19	\$169.95	\$218.91	\$186.62	
\$320.19											
Ponderosa & Jeff pine	68.90	104.00	127.89	94.92	157.00	207.00	171.74	298.54	217.61	237.62*	292.30
All Species	54.50	76.90	80.70	65.46	88.00	125.00	129.00	178.64	166.25	156.70*	234.0

\* Through 3rd quarter.

SOURCE: Calif. Dept. of Forestry  
Forest & Rangeland Assessment Program, 739-2577  
(prepared only every 5-6 years)  
Stumpage figures: Tracy Kent, USFS (415) 705-2543



Price increases will also reduce the effect on the timber industry, because the decreasing value of declining volumes will be off-set to some extent by higher lumber prices. The extent to which price increases and the other factors described above may buffer overall economic and social effects on Sierra County is not possible to predict.

## **The County's Role in Timber Management**

The County's role in timber management is largely limited to compliance with the Timberland Productivity Act and the regulation of uses which could conflict with timber harvest practices or cause conversion of timber lands to other uses.

**Land Use Designations.** The County has recognized the value of its timber lands by designating much of the County General Forest and Intermediate Forest. These designations generally followed old classification terms used by the Toiyabe and Tahoe National Forests with the Intermediate Forest designation on the lower elevation, non-commercial forest.

These land use designations were translated into the General Forest zoning classification with 640 acre minimum parcel sizes (501,652 acres or 82% of the County). However, some forested lands have been within Community Expansion areas in which lots as small as ten acres may occur.

There is no precise mapping of site classification of private lands (with the exception of Sierra Valley — see "Natural Resources of the Sierra Valley Study Area," DWR, 1973). The existing General Plan mapping represents in a generalized way the timber productivity of the private lands. Specific productivity determinations are likely to result only from detailed analysis of individual properties.

It is important to note, however, that past notions of a forest's productivity may be changing. It appears that forest management may change from intensive techniques, typified by clearcutting, to more extensive techniques that may make the areas of lower productivity more important. For this reason, the past distinction between General Forest and Intermediate Forest is not as valid.

County Assessor Bill Copren suggests that viable forest lands be defined by a harvest level of 15 cubic feet/acre/year (180 board feet/acre/year) which would include virtually all of the County's forested lands; this would lead to a single forest designation.

A single Forest designation would eliminate General Plan distinctions between forests on the basis of some specific timber production level; this would be more consistent with the more comprehensive forest management that



appears to be evolving in which more weight is placed on various other resources, such as recreation, wildlife, and watershed.

In the translation of the Forest designation to zoning, the County needs to consistently utilize TPZ rather than another type, such as Williamson Act, to properly reflect the intent of the law (Bill Copren, County Assessor, personal communication, April 1992).

**Potential Land Use Conflicts Related to Timber Production.** Land use conflicts are manifested primarily by complaints of residents about logging truck traffic, safety, noise, dust and visual degradation. Past examples of these conflicts are listed in Table 9-12 below.

**Table 9-12**  
**PAST AND POTENTIAL TIMBER/RESIDENTIAL CONFLICTS**

Location	Conflict
Verdi	Residential subdivision proposed in path of timber access without road construction sufficient to support logging truck traffic
Sierra Brooks, Goodyears Bar, and Downieville	Residential complaints regarding truck safety noise and dust
Sierra City	Community concerns/complaints regarding the visual effects of a timber harvest on the south side of the river

Concerns regarding the safety and air emissions of prescribed burning have also been expressed. To a large degree, the Forest Service, the timber industry, and residents have successfully cooperated to address the safety noise and dust issues. However, these issues and those of access constraints are likely to continue to some extent and to increase if residential areas are allowed in outlying areas. The prescribed burning issue is particularly difficult to resolve because continued fuel accumulation presents a hazard, but burning can generate particulates and other air pollutants. Concerns have also been stated regarding the safety of the prescribed burns. Forestry professionals have endorsed burning, but the practice may come in conflict with air quality standards.

There is community concern that an escalation of these conflicts could negatively influence the long-term viability of timber production. For this



reason the Board of Supervisors adopted the "Policy Supporting Natural Resources Industries", which alerts prospective new Sierra County residents to the fact that resource industries are, and will continue to be, a prominent part of the County's economic activity.

**Potential timberland Conversion.** At least three forms of potential residential development have the potential to reduce the long-term viability of timber production in Sierra County. Each has its own unique set of procedural characteristics and land use problems as described in Table 9-13.



**Table 9-13**  
**CHARACTERISTICS OF THREE FORMS OF RESIDENTIAL DEVELOPMENT**

<b>Type of Residential Development</b>	<b>Procedural Characteristics</b>		<b>Potential Problems</b>
Typical Subdivision	—	Reviewed under the subdivision Map Act	— Often contains a large number of people exposed to timber harvest
	—	Typically subjected to a higher level of environmental review	— Creates a suburban environment and expectations easily violated by timber harvest activities
	—	Project phases normally identified at the outset	
Subdivisions initially presented a Timber Harvests	—	Initially reviewed as a Timber Harvest Plan	— Those listed above
	—	Presented as a subdivision after roads are built and trees are harvested	— Subdivisions which are likely to be among timber lands — The phased review can reduce the County's ability to comprehensively consider land use patterns
Lot splits in outlying areas	—	While reviewed in Sierra County as a subdivision, lot splits are by nature incremental	— Create a dispersed pattern of home sites and potential timber/residential conflicts
	—	Typically approved with a lower level of environmental review	— Create gradual yet spreading cumulative effects which are difficult to foresee and control — May create a higher percentage of "non-industrial" timber lands which can now be harvested without TNPs, and create even more nuisance effects



The potential encroachment of residential uses into timberland and subsequent conversion of that land to other uses does not have the crisis aspect currently exhibited by the environmental versus timber issue discussed in previous sections. However, timberland conversion still presents a serious long-term threat to timber production.

It should be noted that developed commercial or industrial uses on forest lands may also present conflicts with a timber harvest activities and are generally not consistent with the intent of the Timberland Productivity Act.

## Related Plans

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### **Sierra County General Plan 1970**

As noted previously, the 1970 General Plan designated a significant portion of the County in General Forest and Intermediate Forest, translated to General Forest zoning over 82% of the County. The 1970 General Plan also called for protection of forest resources and the timber industry and noted the importance of the industry to the County's economy.

### **Tahoe National Forest Plan-1990**

The 1990 Tahoe National Forest Plan emphasizes the economic uses of the Forest (including timber harvesting) that are compatible with other resource and amenity values. To this end the Plan includes an inventory of timber by type and classifies land suitable for timber harvest. Non-suitable acreage includes non-forested land, area surrounding reservoirs, existing and potential developed recreation sites, spotted owl habitat, Research Natural Areas and Special Interest Areas, and other lands with Special Status (TNF Plan, 1990, Appendix, p. 1-2).

The Plan then includes a Timber Sale Program which quantifies allowable sales quantities to ensure sustained yield by vegetation management practice and by ranger district for a 5-year period and more generally over a 10-year period (1990-99). The 1992-1994 Downieville and Sierraville Ranger District Timber Sale Action Plan averages 57 million board feet (See Table 9-14). A Forest Plan implementation monitoring schedule is also part of the Plan.

According to the TNF Plan EIS (1990), the average annual programmed sale quantity for the entire Forest is 147.6 million board feet (MMBF). The majority of this volume is derived from the 306,000 acres established for intensive forest management in the Timber Management Plan. As described previously, however, these volumes no longer appear to be achievable.



**Table 9-14**  
**TEN-YEAR TIMBER SALE ACTION PLAN**

DISTRICT/ SALE NAME	COMPARTMENT NUMBER	VOLUME (MMBF)	AREA (ACRES)	ROAD MILES (CONST.)	ROAD MILES (RECONST.)	PROBABLE HARVEST METHODS
<b>FY 1990</b>						
<b>DOWNIEVILLE</b>						
Arctic	110	3.0	120	—	1.8	100%T [SWD, CCR]
Butcher	125	12.1	400	0.8	2.5	75%T, 25%SS [CCR, SWD]
Morristown	175	9.0	400	1.3	1.6	25%T, 75%LS [CCR]
Lafayette	075	6.3	200	2.7	4.0	80%T, 20%SS [CCR, SWD]
PRIMROSE 1/ QUARTZ POINT 1/	145	[4.8]	137	0.5	—	100%T [OSR, CCR]
	150	[5.2]	113	2.4	—	65% T, 35% SS [CCR]
Small Sales	—	2.5	—	—	—	100% T
<b>FORESTHILL</b>						
Cavanah N. (BO)	260	12.0	500	0.0	0.0	75%T, 25%SS [CCR]
Bear Wallow (BO)	275	2.5	080	0.0	0.0	100%T [CC]
Hardclimb (BO)	290	4.0	160	0.0	0.0	70%T, 30%SS [CC]
Duncan	305	10.4	300	10.0	3.8	70%T, 30%SS [SWD,CCR,O]
CAVANAH CEN.1/	270	[9.5]	430	0.0	0.0	70%T, 30%SS [CCR]
CAVANAH SO. 1/ Small Sales	270 —	[7.5] 1.5	320 —	0.0 —	0.0 —	100%T [CCR] 100%T
<b>NEVADA CITY</b>						
Magonigal	490	13.0	800	4.2	7.9	100%T [SWD,OSR]
Devils Canyon	455	6.5	580	1.6	3.1	35%T, 65%H [CCR, OSR]
Texas Helicopter	555	4.0	500	0.5	1.0	100%H [OSR, CCR]
Small Sales	—	1.9	—	—	—	100%T
<b>SIERRAVILLE</b>						
Sardine	635	3.9	420	0.0	0.5	100%T [CC, SWD]
Camp	680	3.0	1,000	0.0	1.4	100%T [I, CCR]
Delta	710	4.6	300	1.3	0.2	100%T [SWD, CCR]
Burma	715	3.3	170	0.0	0.0	100%T [CCR, SWD, I]
Church	720	4.6	290	0.7	0.8	100%T [SWD, I, CCR]
Wood Camp	700	3.0	380	0.0	0.8	100%T [SWD, I]
Small Sales	—	2.0	—	—	—	100%T

SOURCE: Tahoe National Forest Land &  
Resource Management Plan 199, Vol. 2, Appendices, p. J-5



<b>Plumas National Forest Plan</b>	There are 39,845 acres of Plumas National Forest within Sierra County. Those lands suitable for timber harvest have not been specifically calculated, but are estimated to be approximately one-half of the 39,845 acre total (Court Bennett, Forest Planner, Plumas National Forest, personal communication, 9/23/92).
<b>Toiyabe National Forest Plan</b>	Lands suitable for timber harvest within Sierra County are estimated to total 14,133 acres with harvest levels difficult to predict (Roland Shaw, Toiyabe National Forest, Carson Ranger District. Personal Communication, 6/92).

## Assumptions

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The following assumptions have been made in preparing goals and policies:

1. Annual timber harvest levels will decline, perhaps to about 1/2 of historic volumes.
2. The Sierra Pacific mill is likely to continue to operate but this could require further diversification of timber bi-product use. Some small mills are expected.
3. The timber industry has been a major factor in allowing Sierra County to retain its rural lifestyle and is needed for future maintenance of this lifestyle.
4. The County's land use role in timber harvest is largely limited to the Timberland Productivity Act and the Forest Practices Act.



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# AGRICULTURAL ELEMENT



GENERAL PLAN  
2012









JULY, 1996

## 10. Agricultural Resources Element

### Background Report

#### Issues

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The following issues were raised at the public General Plan Issues Workshops or at other points during the General Plan process by consultants, staff or Planning Commissioners. While each of these issues may not have resulted in the development of a related policy (as a result of Planning Commission discussion) the list is included here as a record of the full range of concerns discussed.

Key issues are discussed in more detail in the Background Discussion section. The following agriculture-related issues were raised during the General Plan Issues Workshops:

**Table 10-1**  
**SIERRA COUNTY GENERAL PLAN**  
**AGRICULTURAL RESOURCES ISSUES**

**General Plan Issues Workshops**

**Protection of Resource Extraction Economy**

Agriculture is the backbone of the County. How to protect this traditional aspect of Sierra County's economy as an issue.  
(Continued...)



<b>Rural Preserve Concept</b>	Agriculture is becoming less economically viable. The Rural Preserve concept that has been advanced would not be a frozen state but maintenance of traditional activities. How and whether or not to implement the Rural Preserve concept is the issue.
<b>Urban v agricultural land use</b>	Urban v Rural Conflicts are a concern.
<b>Open Range / Right to Farm</b>	Potential loss of open range is an issue. The Right to Farm Ordinance should outline responsibilities on both sides of the fence.
<b>Water</b>	Availability of irrigation water is a major constraint to agricultural development in the County.
<b>Wildlife Conflicts</b>	Poorly managed grazing activities can negatively impact streams, wildlife habitat, and winter deer range.
<b>10-Acre Lots</b>	The existing Community Expansion (10-acre lot min) areas may create agricultural/residential conflicts.
<b>Visual Value</b>	Agricultural land and existing ranch structures, particularly the open nature of the Sierra Valley are of essential visual value to the County.
<b>The following issues were raised at the Agricultural Technical scoping sessions.</b>	
<b>Appropriate Land Uses</b>	The Williamson Act is intended to preserve lands for agriculture and open space uses and to provide tax relief for maintaining these uses. High income producing uses should not be in Williamson Act receiving tax breaks.
<b>Compatibility Problems</b>	Visual degradation and hours of operation can be problems with quasi-industrial activities on agriculture lands.
<b>Economic Needs</b>	There are legitimate agriculture-related uses which do not belong in Williamson Act, but can be provided for in a separate agriculture zone or industrial zone.
<b>Economics of Grazing Lands</b>	The economic viability of "marginal" lands should not be an issue because they are normally part of an overall package of needs on any one ranch.
<b>Wildlife Conflicts</b>	Deer are costly to the ranches and can negatively impact grazing land.
<b>Agricultural Land Conversion</b>	Pressure to convert ranches to large lot residential areas has been evident in and around Sierra Valley, particularly in Plumas County.

Soils is listed as a Mandatory Issue for the Conservation Element (p. 117) and open space for the managed production of resources, including agricultural lands, is a Mandatory Issue for the Open Space Element (p. 132).



## Background Discussion

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Agriculture is a historic and on-going land use in Sierra County. The more intensive forms of agriculture — livestock production and field crops — primarily occur in Sierra Valley, but Sardine Valley and other isolated locations also support these issues. Pike is the location of apple orchards.

This background report presents statistics for the 60,235 harvested acres that were reported for Sierra County in the 1990 "Annual Crop and Livestock Report" with a focus on Sierra Valley. However, information is also presented on the use of range. Timber production is addressed in the Timber Element.

### Soils

**Sierra Valley Soil types.** The following discussion of soil types is limited to Sierra Valley because that is where most agricultural activity takes place and because it is the area for which detailed soils information for private land is available. The "Soil Survey of Sierra Valley Area, California," 1975 (Survey), provides mapping and descriptions of the principal arable soils in the County; the soils maps of this section are compiled from the Survey as are most of the descriptions which follow. The Survey groups a number of specific soil types in the Valley into ten soil associations occurring on four general kinds of landscapes; these associations are summarized in Table 10-2 and shown on the General Soil Map (Figure 10-1).



**Table 10-2**  
**SUMMARIZED USES FOR THE**  
**SOIL ASSOCIATIONS OF SIERRA VALLEY**

	<b>Soil Description</b>	<b>Primary Uses</b>
<b>Mountainous Plains</b>	<b>1. Trojan-Delleker-Portola association.</b> Well-drained, gently sloping to steep sandy loams, cobbly sandy loams, and stony sandy loams forming in materials weathered from volcanic rocks.	The soils in this association are used mainly for timber production and for grazing. Most areas capable of producing timber have been logged and present stands consist of regrowth. Growth rates of pine are moderate. Sagebrush land and open areas in woods are commonly grazed by livestock, deer, and other animals.
	<b>2. Toiyabe-Bonta-Haypress association.</b> Excessively drained to well-drained, gently sloping to very steep loamy coarse sands forming in materials weathered from acid igneous rocks.	The soils in this association are used for timber. Most areas capable of producing timber have been logged at least once. Thus, the present stands are made up of trees that have replaced the original ones. These soils are also used for growing Christmas trees. Other wood products are firewood, poles, and posts. Brush encroachment, particularly by manzanita, sagebrush, and ceanothus, is a concern. Selected sites have served as a source of decomposed granite used as road base and topdressing for local roads.
	<b>3. Basic rock land-Aldax-Millich association.</b> Rock land and well-drained and somewhat excessively drained, moderately sloping to very steep gravelly sandy loams and very stony loams forming in materials weathered from basic igneous rocks.	The sparse vegetative cover on the Aldax and Millich soils is used by livestock and wildlife. Basic rock land and the included areas of Acidic rock land and Rough broken land have no value for farming. The steep, stony, rather inaccessible areas provide protection and cover for deer, upland birds, and small mammals. These shallow uplands have high runoff rates and make up a sizable part of the water sheds that contribute to the Last Chance Creek and Long Valley Creek drainages.

(. . . Continued)

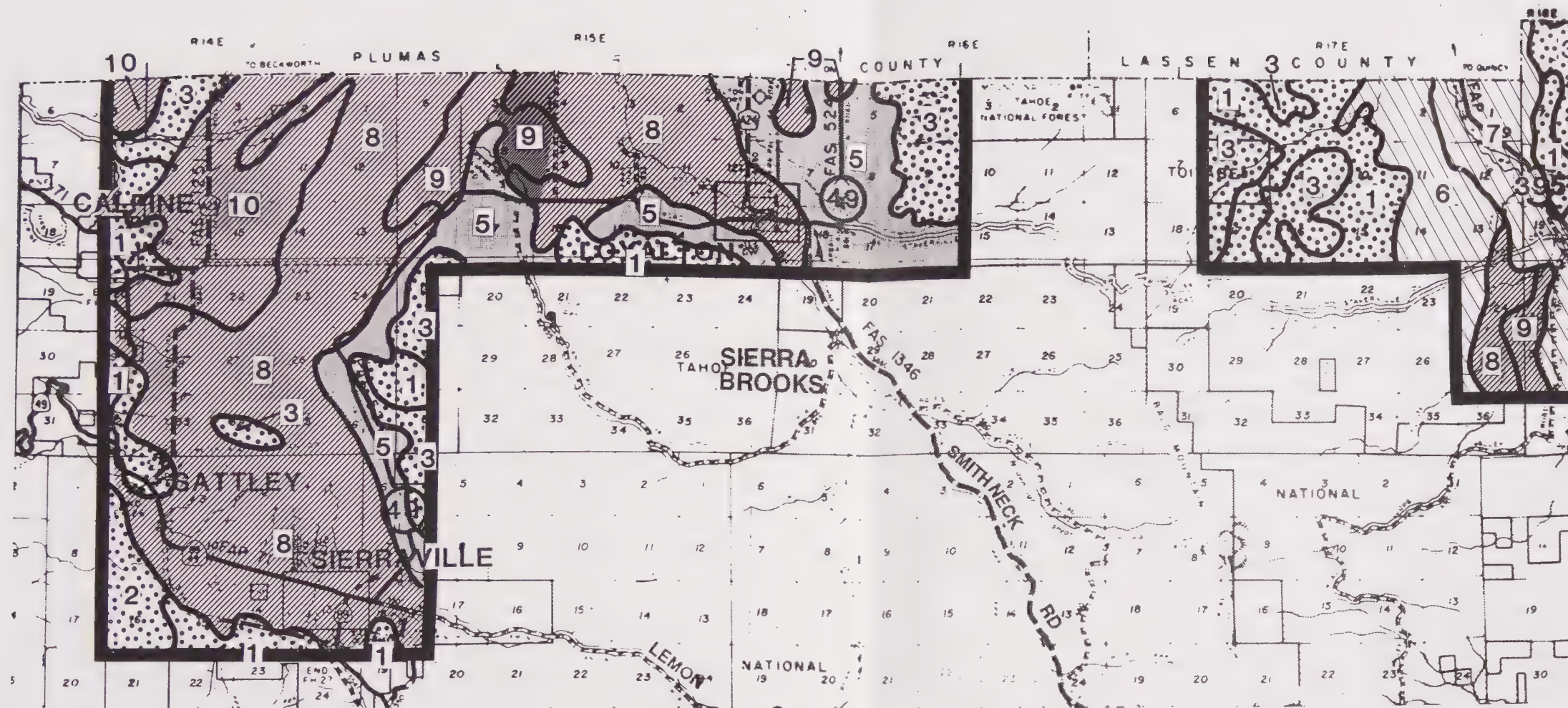


	Soil Description	Primary Uses
Terraces and Lands Bordering Sierra Valley	<b>4. Mottsville-Quincy association.</b> Excessively drained, gently sloping to strongly sloping loamy sands and sands.	The soils in this association are used mainly for unimproved range. These soils are droughty, moderately steep in places, and easily eroded. They are in areas where a system for providing irrigation water has not been developed. The Quincy soils are on the unstabilized landscape where dunes and drifting sand are common.
	<b>5. Dotta-Martineck-Bieber association.</b> Well drained, nearly level to moderately steep sandy loams, gravelly sandy loams, cobbly sandy loams, and very stony sandy loams.	About half of the soils in this association are too stony, too cobbly, or too shallow to be used for other than unimproved range. In places areas of the Dotta and Bieber soils are used for growing pasture plants, small grains, and some alfalfa.
Terraces Bordering Long Valley	<b>6. Trosi-Saralegui association.</b> Well-drained, gently sloping to moderately steep loamy very stony sandy loams, and extremely stony sandy loams.	The soils in this association are used mainly for range and as watershed.
	<b>7. Galeppi-Reno-Reba association.</b> Well drained, gently sloping to moderately steep loamy coarse lands, cobbly loamy coarse sands, and sandy loams.	These soils are used mostly for range. A few areas are used for growing irrigated truck crops or other crops.
Valley Bottoms	<b>8. Ramelli-Balman-Pasquetti association.</b> Very poorly drained to moderately well drained, nearly level to gently sloping clays, mucky silty clays, and loams.	The soils in this association are used for native or meadow pasture, irrigated pasture, small grains, and hay.
	<b>9. Beckwourth-Loyalton-Ormsby association.</b> Poorly drained to moderately well drained, nearly level to gently sloping loamy coarse sands, coarse sandy loams, fine sandy loams, and silt loams.	These soils are used for cereal rye, alfalfa, irrigated pasture, small grains, annual pasture, and range.
	<b>10. Calpine-Lovejoy-Dotta association.</b> Well drained and moderately well drained, nearly level to moderately sloping coarse sandy loams, sandy loams, clay loams, and loams.	The soils in this association are used for small grains, cheat grass, irrigated pasture, row crops, hay, annual pasture, and range.



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Source: U.S. Department of Agriculture, Soil Conservation Service, Forest Service, University of California Agricultural Experiment Station. Compiled 1972.

#### SOIL ASSOCIATIONS\*

##### SOILS ON MOUNTAINOUS UPLANDS

- Trojan-Delleker-Portola association: Well-drained, gently sloping to steep sandy loams, cobbly sandy loams, and stony sandy loams forming in materials weathered from volcanic rocks
- Toiyabe-Bonta-Haypress association: Excessively drained to well-drained, gently sloping to very steep loamy coarse sands forming in materials weathered from acid igneous rocks
- Basic rock land-Aldax-Millich association: Rock land and well-drained and somewhat excessively drained, moderately sloping to very steep gravelly sandy loams and very stony loams forming in materials weathered from basic igneous rocks

##### SOILS ON TERRACES AND FANS BORDERING SIERRA VALLEY

- Mottsville-Quincy association: Excessively drained, gently sloping to strongly sloping loamy sands and sands
- Dotta-Martineck-Bieber association: Well-drained, nearly level to moderately steep sandy loams, gravelly sandy loams, cobbly sandy loams, and very stony sandy loams

##### SOILS ON TERRACES BORDERING LONG VALLEY

- Troisi-Saralegui association: Well-drained, gently sloping to steep sandy loams, very stony sandy loams, and extremely stony sandy loams
- Galeppi-Reno-Reba association: Well-drained, gently sloping to moderately steep loamy coarse sands, cobbly loamy coarse sands, and sandy loams

##### SOILS IN THE VALLEY BOTTOMS

- Ramelli-Balman-Pasquetti association: Very poorly drained to moderately well drained, nearly level to gently sloping clays, mucky silty clays, and loams
- Beckwourth-Loyalton-Ormsby association: Poorly drained to moderately well drained, nearly level to gently sloping loamy coarse sands, coarse sandy loams, fine sandy loams, and silt loams
- Calpine-Lovejoy-Dotta association: Well drained and moderately well drained, nearly level to moderately sloping coarse sandy loams, sandy loams, clay loams, and loams

\* Texture is that of the surface layer of the major soils.

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.









The various soil associations described above are divided into individual soil types called "soil series". Each soil type is also grouped into three levels: 1) capability class, 2) subclass, and 3) units. These are described in the Soil Capability Grouping table (Table 10-3).

The Sierra Valley area and probably the remainder of the County, contain capability class soils as high as Level III (Capability Classes I and II are typically thought of as prime agricultural soils). Figure 10-2 shows all of the soils in the Sierra County portion of Sierra Valley and highlights the arable soils (Classes III and IV). As shown, large parts of Sierra Valley's soils are considered arable. Table 10-4 provides a look at the relative yields of the arable soils in the area.

**Soil Conservation** Loss of top soil to erosion is generally not a major problem on the Valley floor where slopes are gentle and a thick crop cover is maintained. Erosion can be more of a concern on the alluvial terraces bordering Sierra Valley. The Sierra Valley Resource Conservation District is the lead agency for the control of erosion in the Eastern County. (Erosion hazard is also addressed in the Water Resources Element.)

### **Crop and Livestock Production**

Climate and Water Supply. While there exist arable lands in Sierra Valley, a major constraint to crop production is climate as described in the following excerpt from the Soil Survey:

The farm economy of the Area is based on livestock, mainly beef cattle, and lumber. The principal crops are hay and pasture, but the choice of crops is severely restricted by the climate. The length of the frost-free season ranges from 30 to 90 days. Most precipitation falls as snow. The summers are generally mild, and midday temperatures are around 80° F. Winter temperatures are often around 0° F and below.

As in other locations in the Western States, water is also a constraint to cultivation in Sierra Valley. Snow melt provides a major source of irrigation water to Sierra Valley. This source is supplemented by water diverted from the Little Truckee River by the Sierra Valley Water Company, as well as by various groundwater wells. The locations and amounts of Irrigated Cultivated Lands and Dry-Farmed Cultivated lands are shown on Figure 10-3 based on the Department of Water Resources 1972 Sierra Valley Study (*An Interagency-Multidisciplinary Investigation of the Natural Resources of the Sierra Valley Study Area*, DWR, 1973).



**Table 10-3**  
**SOILS CAPABILITY GROUPING**

**CAPABILITY CLASSES**

The broadest groups are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

**Class I** soils have few limitations that restrict their use. (None in Sierra Valley Area)

**Class II** soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices. (None in Sierra Valley Area)

**Class III** soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

**Class IV** soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

**Class V** soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife. (None in Sierra Valley Area)

**Class VI** soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife.

**Class VII** soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

**Class VIII** soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or to aesthetic purposes.

**CAPABILITY SUBCLASSES**

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In Class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in Class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

(Continued . . .)



## SOILS CAPABILITY GROUPING (Cont.)

### CAPABILITY UNITS

Capability units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils.

Capability Units III and IV are given Arabic numbers that suggest the chief kind of limitation responsible for placement of the soil in the capability class and subclass. For this reason, some of the unit within the subclasses are not numbered consecutively, and their symbols are a partial key to some soil features. The numerals used to designate units within the classes and subclasses are:

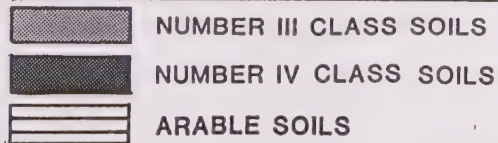
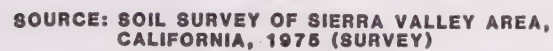
- |   |  |
|---|--|
| 0. A problem or limitation of a soil underlain by sand or gravel.   | 5. A problem or limitation caused by clay texture.   |
| 1. A problem or limitation caused by slope or by actual or potential erosion hazard.  | 6. A problem or limitation due to saline or alkaline conditions.   |
| 2. A problem or limitation of wetness caused by poor drainage or flooding.  | 7. A problem or limitation caused by rocks or cobbles.   |
| 3. A problem or limitation of slow or very slow permeability of the subsoil or substratum caused by a clay subsoil or a semi-consolidated substratum. | 8. A problem or limitation in the root zone, which generally is less than 36 inches over massive bedrock or hardpan and lacks moisture for plants.                       |
| 4. A problem or limitation caused by low available water capacity of sandy or gravelly soils.   | 9. A problem or limitation caused by low or very low fertility, acidity, or toxicity that cannot be corrected by adding normal amounts of fertilizer or soil amendments. |

Soils in units V through VIII are given the single non-connotative number 1.



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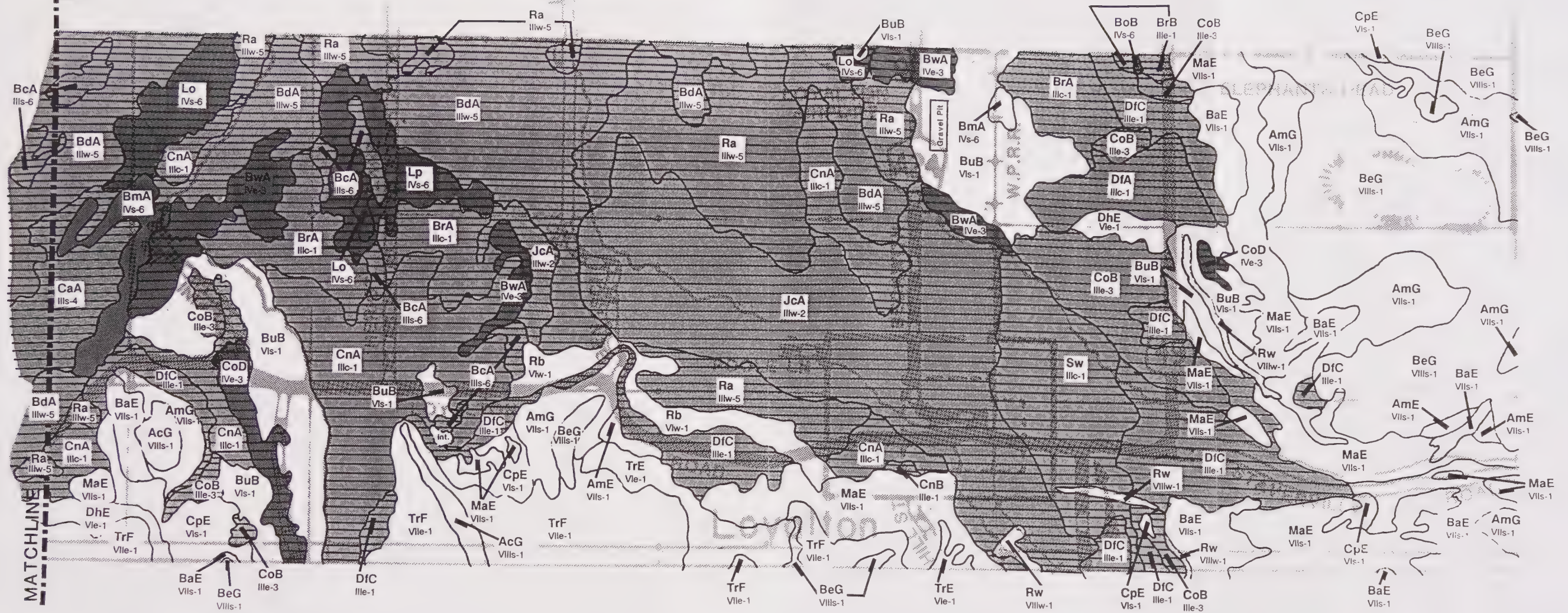
**MAP 1 OF 3**











SOURCE: SOIL SURVEY OF SIERRA VALLEY AREA,  
CALIFORNIA, 1976 (SURVEY)

#### SIERRA VALLEY SOILS

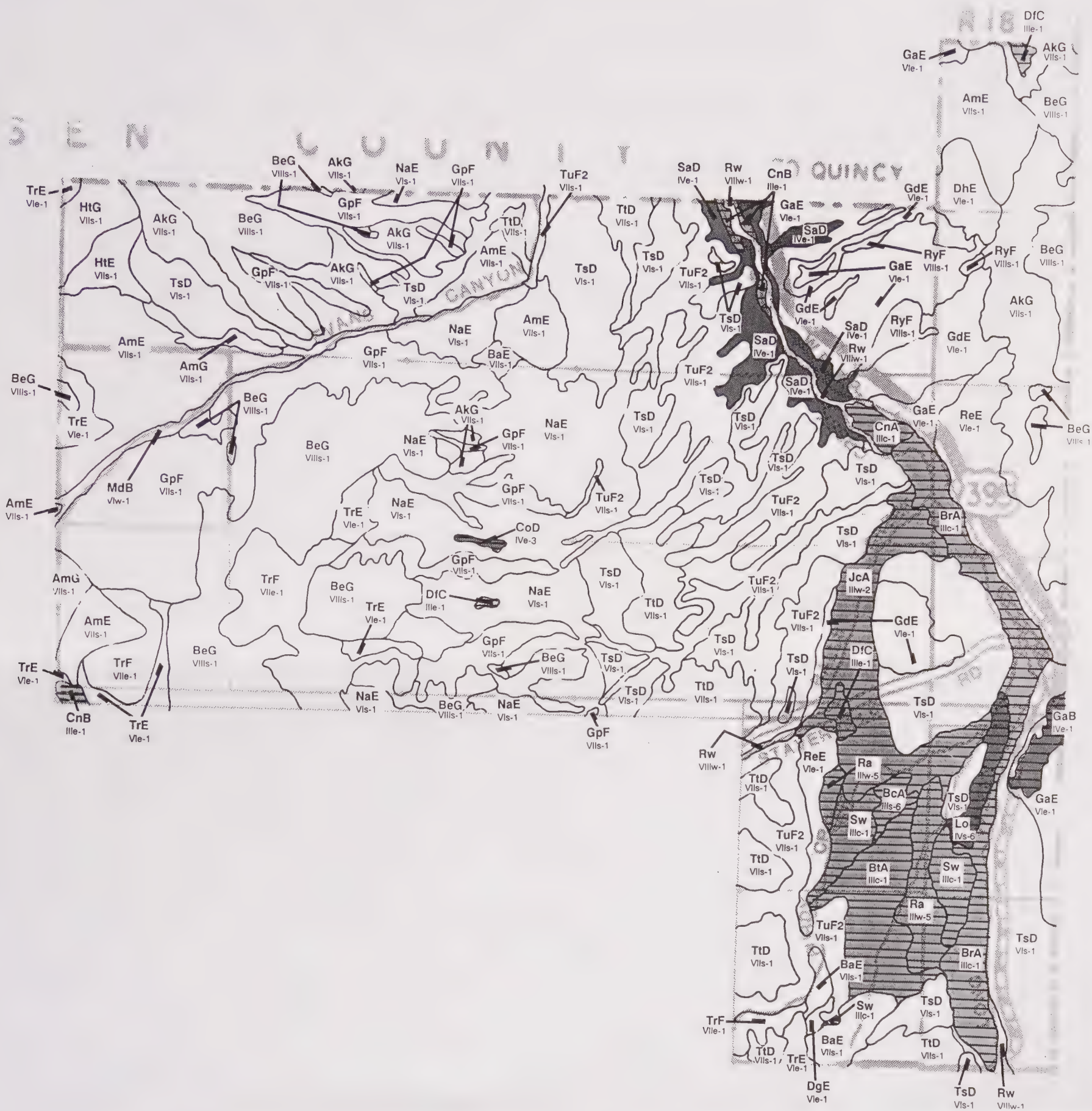
- NUMBER III CLASS SOILS
- NUMBER IV CLASS SOILS
- ARABLE SOILS











SOURCE: SOIL SURVEY OF SIERRA VALLEY AREA,  
CALIFORNIA, 1975 (SURVEY)

SIERRA VALLEY SOILS	
	NUMBER III CLASS SOILS
	NUMBER IV CLASS SOILS
	ARABLE SOILS

Fig 10-2 Cont









**Table 10-4**  
**ESTIMATED AVERAGE YIELD PER ACRE OF PRINCIPAL CROPS**

[Only arable soils are listed in this table. Absence of data indicates that the crop is not grown on the soil or that the crop is not suited to the soil]

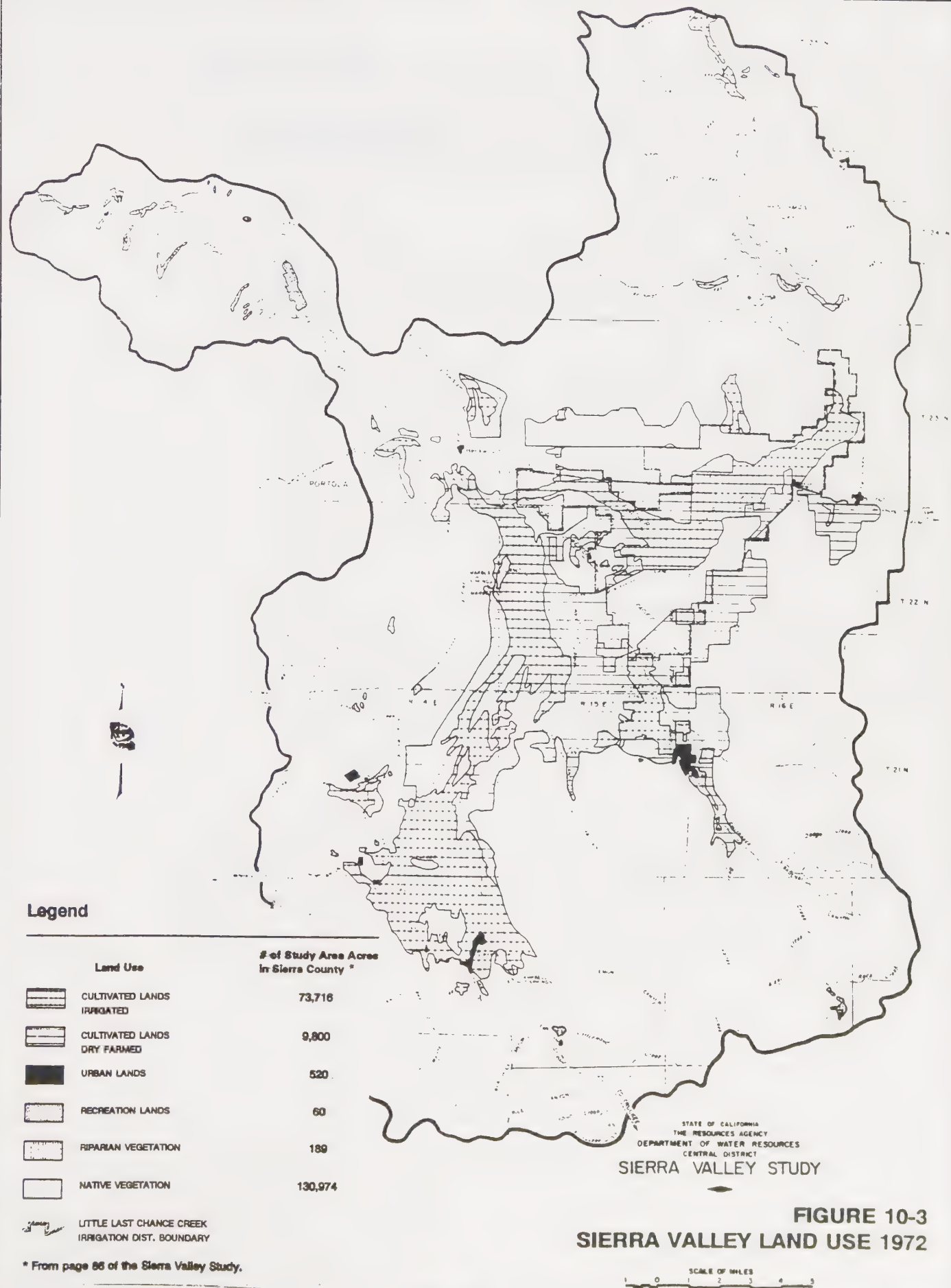
Soil	Oat hay	Legume- grass hay	Pasture	Dryland crops					
				Barley	Wheat	Rye	Oats	Cereal- rye hay	Alfalfa- grass hay
	Tons	Tons	Animal-unit months <sup>1</sup>	Lbs	Lbs	Lbs	Lbs	Tons	Tons
Balman loam, 0 to 2 percent slopes.....	1.5	3.0	8	700	700	600	800	1.25	2.0
Balman loam, 2 to 5 percent slopes.....	1.5	3.0	8	700	700	600	800	1.25	2.0
Balman-Ramelli complex, 0 to 2 percent slopes.....	1.5	2.0	8	700	700	600	700	1.1	1.0
Beckwourth loamy coarse sand.....	2.0	3.0	7	1,200	1,200	1,000	1,200	1.5	1.5
Beckwourth loamy coarse sand, clayey sub- stratum.....	2.0	3.0	7	1,200	1,200	1,000	1,200	1.5	1.5
Beckwourth sandy loam.....	2.0	3.0	7	1,200	1,200	1,000	1,200	1.5	1.5
Beckwourth-Loyalton complex, saline- alkali, 0 to 2 percent slopes.....	1.5	1.5	4	600	600	550	600	0.8	1.0
Beckwourth-Ormsby loamy coarse sands.....	1.5	2.5	7	800	700	600	700	1.0	1.5
Bellavista loam, 0 to 2 percent slopes.....	2.0	2.0	5	700	700	600	800	1.0	1.0
Bellavista loam, 2 to 5 percent slopes.....	2.0	2.0	5	700	700	600	800	1.0	1.0
Bidwell sandy loam, 0 to 2 percent slopes.....	2.5	4.0	10	1,200	1,500	1,000	1,500	1.5	1.75
Bidwell sandy loam, 2 to 5 percent slopes.....	2.5	4.0	10	1,200	1,500	1,000	1,500	1.5	1.75
Bidwell sandy loam, sandy substratum, 0 to 2 percent slopes.....	2.5	4.0	10	1,200	1,500	1,000	1,500	1.5	1.75
Bidwell loam, 0 to 2 percent slopes.....	2.5	4.0	10	1,200	1,500	1,000	1,500	1.5	1.75
Bieber sandy loam, moderately deep, 0 to 2 percent slopes.....	1.5	2.5	8	650	650	600	650	1.2	1.2
Calpine coarse sandy loam, 0 to 2 percent slopes.....		3.0	8	900	1,000	800	900	1.1	1.5
Calpine coarse sandy loam, 2 to 5 percent slopes.....		3.0	8	900	1,000	800	900	1.1	1.5
Calpine coarse sandy loam, 5 to 9 percent slopes.....		3.0	8	900	1,000	800	900	1.1	1.5
Calpine coarse sandy loam, clayey variant, 0 to 2 percent slopes.....		3.0	8	900	1,000	800	900	1.1	1.5
Coolbrith silt loam, 0 to 2 percent slopes.....	2.5	4.0	10	1,200	1,750	1,000	1,200	1.3	1.75
Coolbrith silt loam, 2 to 5 percent slopes.....	2.5	4.0	10	1,200	1,750	1,000	1,200	1.3	1.75
Correco sandy loam, 2 to 5 percent slopes.....		2.5	8	800	1,000	700	800	1.1	1.5
Correco sandy loam, 5 to 15 percent slopes.....		2.5	8	800	1,000	700	800	1.1	1.5
Delleker sandy loam, 2 to 15 percent slopes, eroded.....		2.0	6	800	1,000	700	800	1.1	1.5
Dotta sandy loam, 0 to 2 percent slopes.....	1.5	3.5	10	1,000	1,200	800	1,000	1.1	2.0
Dotta sandy loam, 2 to 9 percent slopes.....	1.5	3.5	10	1,000	1,200	800	1,000	1.1	2.0
Galeppi loamy coarse sand, 2 to 5 percent slopes.....		4.0	10						
James Canyon gravelly loam, 2 to 5 percent slopes.....	2.5	4.0	10	1,200	1,200	1,000	1,200	1.1	2.25
James Canyon silt loam, 0 to 2 percent slopes.....	2.5	4.0	10	1,200	1,200	1,000	1,200	1.1	2.25
Lovejoy loam, 0 to 5 percent slopes.....						800		1.0	
Loyalton fine sandy loam.....	1.5	1.5	4	600	600	550	600	0.8	1.0
Loyalton silt loam.....	1.5	1.5	4	600	600	550	600	0.8	1.0
Ormsby loamy coarse sand, 0 to 2 percent slopes.....		2.5	7						1.5
Ormsby loamy coarse sand, 2 to 5 percent slopes.....		2.5	7						1.5
Ormsby coarse sandy loam, poorly drained, 0 to 2 percent slopes.....		2.5	7						1.5
Ormsby coarse sandy loam, poorly drained, 2 to 5 percent slopes.....		2.5	7						1.5
Ramelli clay.....	1.75	2.0	8	700	700	600	700	1.1	1.0
Smithneck sandy loam.....	2.5	3.5	10	1,000	1,200	800	1,000	1.5	3.0

<sup>1</sup> The amount of forage or feed required to maintain one animal unit—one cow, one horse, one mule, five sheep, or five goats—for a period of 30 days.



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\* From page 86 of the Sierra Valley Study.

**FIGURE 10-3**  
**SIERRA VALLEY LAND USE 1972**

SCALE OF MILES  
0 1 2 3 4 5



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The following passage from the Survey indicates a potential for improved crop yields based on possible increased groundwater use:

As dependable sources of irrigation water develop, improved management practices are being applied. Old sod-bound meadows are broken up, the land is leveled for better use of irrigation water, and improved mixtures of grass and legumes are seeded. Some of the new seedings have been fertilized.

Improved plant species and management practices are continually being developed by ranchers cooperating with the Soil Conservation Service and the County Farm Advisor. Other ranchers in the Area adopt many of the improved practices as they prove feasible.

While yields of meadow hayfields over the Area as a whole average less than 3/4 ton per acre, many improved fields have produced 5 tons per acre or more. Some of the soils from which high yields have been obtained are James Canyon, Smithneck, Beckwourth, Ormsby, and Coolbrith (fig. 25). Other soils will no doubt prove quite productive after improvement.

Alfalfa-grass hay and grain are often grown dryland. Production is quite variable because of the rainfall, and frost often reduces the yield of both crops. Grain crops are most subject to frost damage while in bloom or in the milk stage. If frost occurs at this time, the crop is usually harvested for hay.

Sufficient and timely spring rains are very important to the dryland crops, especially on the sandier or shallower soils. Annual precipitation in the survey area ranges from about 6 inches in Long Valley to about 22 inches at Sierraville. Most of Sierra Valley averages 14 to 20 inches, most of it as snow in the late fall and winter. The rains that fall in the spring are generally adequate for a fair crop, but conditions suitable for a really good crop cannot be expected to occur regularly (Soil Survey, pp. 64-65).

**Livestock and Forage Practices** ~ The following overview of livestock and forage practices is an excerpt of a Chapter from "An Interagency-Multidisciplinary Investigation of the Natural Resources of the Sierra Valley Study Area", prepared by the California Department of Water Resources, 1973.



## Chapter IX LIVESTOCK AND AGRICULTURAL PRACTICES\*

### LIVESTOCK

The Sierra Valley Study area is used primarily to produce forage for livestock. At the highest period of concentration, there are approximately 17,000 cows with calves, 1500 yearlings, and 1000 sheep using the forage in the study area.

Most of the Cattle - 80 percent - move into the pastures during the months of May and June. These cows are calved in the Central Valley area during the fall and winter months. The calves from these cows are called heavy calves, and are sold between August 15 and September 1. The breeding herd moves back to the central valleys of California in November and early December. The other 20 percent of the cattle remain in the study area for the entire year. These cows are calved in March and April and produce the light calves which are usually sold in November. Some of the hay produced from the meadows, alfalfa acres, and grain are fed and utilized during the winter months in the livestock rations.

The gross income from all livestock sold in the study area will probably exceed 2½ million dollars, and is important to the area.

There is very little use of pesticides for the control of parasites. There is very little supplemental feed brought into the area and used as livestock feed. Most of it is produced within the area. There are no commercial feedlots. The main concentrations of cattle occur between December 1 and April 15 on the winter feed grounds. Otherwise, they are well distributed over the entire study area.

### FORAGE

Alfalfa is a very important forage producing crop in the study area. Those acres in alfalfa receiving no irrigation (dryland) produce average yields of 1.5 tons per acre, while those which are irrigated are producing an average of 3.0 tons per acre. This crop is primarily used for winter feed and is the one hay crop which very nearly meets the nutrient requirements of the young growing animals. The average life of irrigated stands of alfalfa is five to six years, while dryland acres continue to produce seven to eight years.

Most alfalfa is fertilized with sulphur, which is provided from fall or winter applications of 450 pounds per acre of gypsum every three years. Some areas are showing a boron deficiency, which may be corrected with applications of ten pounds of actual boron per acre per year. Some of the stands receive applications of a weedicide to control the annual grasses and broadleaved weeds, which cause a problem in the first cutting of hay.

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\* Prepared by University of California Agricultural Extension Service, Farm Advisor



Because of the short length of the frost-free period, only two cuttings of hay are taken per year from the winter hardy varieties used.

The alfalfa weevil is the main pest of this crop. Some acres are sprayed with a pesticide to control the yield-reducing damage caused by the eating habits of this pest. Some control is obtained by early cutting on the rest of the crop.

The June frosts are also a hazard to this crop, and when temperatures get into the low 20's, the entire crop is damaged. When the stand drops to a low point where it is no longer economical to hay, it is put into a grain or grain hay crop for two to three years, to clean up the weeds, and then it is returned to alfalfa.

Mountain meadows produce summer forage for livestock and some hay for winter feed for those animals which stay in the area all year. The plant varieties which produce this forage are sedges; rushes; timothy; red top; Kentucky bluegrass; red clover; alsike clover; and Beckwourth clover. Some nitrogen fertilizer is being used (ammonium sulphate) and applied to provide 40 to 60 pounds of nitrogen per acre.

Where these meadows are grazed and harvested by livestock, the animals may be put on between April 15 and June 1. Those that are cut for hay produce on the average three-fourths ton per acre and are grazed for aftermath in the fall of the year.

Depending on the year, irrigation may start as early as May 15 and, except for the Last Chance area, the water supply for irrigation is gone usually by July 1. In some of the areas, the sedges and rushes are being controlled through the use of the low-volatile ester of 2,4-D. Applications of fertilizers are then applied to encourage the timothy and red top, and thereby increase yields and quality of the forage produced. These meadows produce most of the beef, which is the main source of income for the agricultural interests of Sierra Valley.

Improved pastures are the result of land levelling, better irrigation systems, and planting introduced species. The introduced grasses are usually very competitive and cause a reduction in the clover growth within two years. Most of these acres are treated the same as the meadows, except for those which are irrigated by well water, and these receive water throughout the season. Irrigation is better controlled and much more efficient than the methods used on meadows. Some hay is produced, but most of the acres are pastured. The introduced species of grasses are more efficient in the use of fertilizers and respond better to applications of nitrogen than the meadow species.

Range pastures are those which are producing early forage for livestock. The main brush species are sagebrush and rabbitbrush. Aerial application of weedicide is made periodically to control the brush species on this type of pasture to release the native forage species to produce more livestock feed.

Livestock start pasturing these areas around April 1 to 15, but due to the lack of irrigation, are removed around July 1.

Introduced species of dryland grasses are planted on some of the acres which have been sprayed to control the brush. These sprayed areas produce a low-growing sedge and some of the annual grasses and forbes. There are approximately 25,000 acres of this type of forage production on the Sierra Valley floor.



## PROJECTIONS

1. Because of the high nutritional value of alfalfa, there will be an increase in the number of acres of this crop grown in the study area.
2. With increased use of the available technology, increased yields of forage will result within the limits of climate.
3. Due to improved disease identification and control methods, improved breeding and nutritional programs, more beef per cow will be produced.
4. More outside pressures, and increased costs, will increase the production costs and cause management changes.
5. More of the range pasture will be converted into cropland.
6. An increase in the demand for water will result in more wells, and more efficient use of the water for irrigation.

**Crop Value ~** The range of crops grown in 1992 and the value of those crops, as well as that of livestock, are shown in Table 10-5 (from the 1992 "Annual Crop and Livestock Report"). The total \$6,070,100 figure exceeds that reported in the 1967 General Plan: \$1,193,720. In 1990 dollars, the 1967 value is equivalent to roughly \$4,774,000.

**Farm Characteristics ~** Recently, the economic activity described above has occurred on 46 farms averaging 1116 acres (Ray Borton, California Department of Food and Agriculture, Personal Communication, 3/23/92). This is roughly comparable to the figures for 1964 reported in the 1967 General Plan shown in Table 10-6.



**Table 10-5**  
**SIERRA COUNTY LIVESTOCK PRODUCTION/VALUE**  
**1992 Agricultural Production Report**



1992 AGRICULTURAL PRODUCTION REPORT

SIERRA COUNTY

**LIVESTOCK**

ITEM	YEAR	NUMBER OF HEAD	PRODUCTION		UNIT	VALUE	
			TOTAL LIVEWEIGHT			PER UNIT	TOTAL
CATTLE & CALVES	1992	7,200	55,751		CWT	73.07	\$ 4,073,700
	1991	7,250	51,000		"	74.63	\$ 3,805,900
OTHER LIVESTOCK	1992						\$ 20,700
	1991						\$ 22,700
TOTAL LIVESTOCK	1992						\$ 4,094,400
	1991						\$ 3,828,600



**FIELD CROPS**

ITEM	YEAR	HARVESTED ACREAGE	PRODUCTION		UNIT	VALUE	
			PER ACRE	TOTAL		PER UNIT	TOTAL
ALFALFA HAY	1992	750	3.15	2,363	TONS	89.00	\$ 210,300
	1991	800	2.85	2,280	TONS	81.00	\$ 184,700
MEADOW HAY	1992	2,500	2.11	5,275	TONS	86.00	\$ 453,700
	1991	3,000	2.70	8,100	TONS	93.00	\$ 753,300
GRAIN HAY	1992	800	2.11	1,688	TONS	80.00	\$ 135,000
	1991	1,000	1.20	1,200	TONS	80.00	\$ 96,000
IRR. PASTURE	1992	10,800			ACRE	32.00	\$ 345,600
	1991	10,800			ACRE	32.00	\$ 345,600
MEADOW PASTURE	1992	22,600			ACRE	12.00	\$ 271,200
	1991	22,600			ACRE	12.50	\$ 282,500
RANGE PASTURE	1992	22,000			ACRE	3.50	\$ 77,000
	1991	21,200			ACRE	3.50	\$ 74,200
ALL GRAIN	1992	315			ACRE		\$ 23,900
	1991	350			ACRE		\$ 40,600
TOTAL							
FIELD CROPS	1992	59,765					\$ 1,516,700
	1991	59,750					\$ 1,776,900
MISCELLANEOUS CROPS*	1992						\$ 9,000
	1991						\$ 10,700
CHRISTMAS TREES (Priv. Forest)	1992			36,000	TREES	12.50	\$ 450,000
	1991			35,000	TREES	12.50	\$ 437,500
TOTAL CROPS	1992						\$ 1,975,700
	1991						\$ 2,225,100
GRAND TOTAL	1992						\$ 6,070,100
	1991						\$ 6,053,700

PRODUCTION      1991 GROSS TIMBER HARVEST  
48,700 MBF      VALUE \$6,831,000

\* Nursery, Apiary, Seed, Fruit

SOURCE: "1992 Plumas County Sierra County Annual Crop and Livestock Report"  
Plumas-Sierra Counties Dept. of Agriculture



**Table 10-6**  
**BASIC FARM CHARACTERISTICS**

Year	#Farms	Avg Size
1930 <sup>a</sup>	92	1300
1940 <sup>a</sup>	86	699
1950 <sup>a</sup>	69	1253
1959 <sup>a</sup>	49	1881
1964 <sup>a</sup>	41	1253
1982 <sup>b</sup>	61	875
1987 <sup>b</sup>	46	1116

SOURCES: <sup>a</sup>Sierra County General Plan. 1967  
<sup>b</sup>1987 Census of Agriculture

**Table 10-7**  
**SELECTED FARM CHARACTERISTICS**

Year	.....Tenure of Operator.....			Operator ....Place of Residence..			Operators by Principal ..Occupation..	
	# Owner	Part Owner	# Tenant	On	Not	Not	Farming	Other
	Operated	Operated	Operated	Farm on	Farm on	Reported	Reported	Reported
1959 <sup>a</sup>	27	13	7					
1964 <sup>a</sup>	29	8	3					
1982 <sup>b</sup>	39	13	9	46	12	3	34	27
1987 <sup>b</sup>	30	6	10	27	16	3	23	23

Year	Operators by Days of .... Work Off the Farms.....				.....Operators by Years on Present Farm....				
	200 days		Not		2 yrs	3/4	5-9	10 yrs	Not
	None	Any	or more	Reported	or less	Years	Years	or More	Reported
1982 <sup>b</sup>	19	38	19	4	6	13	15	20	7
1987 <sup>b</sup>	16	29	17	1	2	5	17	18	4

SOURCES: <sup>a</sup>Sierra County General Plan. 1967  
<sup>b</sup>1987 Census of Agriculture.



Overall, the most apparent trend appears to be declining numbers of farms until 1959; there has also been an increase in the number of tenant operated farms since the previous General Plan (Table 10-7). While two time periods (1982 and 1987) are not sufficient to establish a trend, there are initial indications of a drop in the number of on-the-farm operators and farming as the principal occupation of farm operators (Table 10-7).

In 1966 the citizens committee working on the General Plan made the following observations on future changes in agriculture:

In the words of the committee as published in the 1966 report " "In projecting the future of agriculture for Sierra County to the year 2000 some of the changes which may continue are as follows:

1. Farmers will be using more borrowed money to operate their unit.
2. More brushland will be converted to improved varieties and species and increased feed production.
3. More fertilizer will be used to increase yields.
4. Improved technology will increase beef yields.
5. More water for irrigation.
6. Improve the efficiency of irrigating.
7. A decrease in the grain and grain hay produced.
8. Net income due to agriculture should remain stable.
9. Due to rising costs the numbers of cattle which enter in the county may increase or the cow and calf operations may become strictly summer pastures for stockers and feeders.
10. There is a possibility of an increase in the production of apples for commercial outlets.

"Because agriculture is an important source of income to Sierra County, careful consideration should be given to any changes which may be proposed to decrease the land being used for the production of agricultural products." (Sierra County General Plan, 1967. p. 32)

An earlier study for the Department of Water Resources (Bulletin 58, referenced on pp. 26, 32 of the 1967 General Plan) predicted that by the years 2020-2050, the amount of farm acreage would increase to 100,000 acres, the number of farms would increase to 280, and the size of the farm would decrease to 357 acres. In contrast to these predictions, the basic statistics have been mostly stable.

The 1967 General Plan itself predicted smaller and slower changes:

What does appear more likely is for a slow increase in development irrigated farm acreage in larger units for reasons of economy. Although this is a state-wide trend now, and has gained some inroads in the county, it doesn't seem likely that the owner-operated family farm will be as prevalent in the future. Present impression is that there



will be larger farm units under intensive management practices, with greater investment in equipment and irrigation, and more intensive production along the same lines as today - more beef and forage crops. Certainly the trends have been in this direction; and it doesn't seem too likely that the future will present other different agricultural production.

These predictions appear closer to what has actually occurred.

## **Loss of Agricultural Lands**

**The Conversion Problem** ~ The conversion of agricultural lands to other uses is an ongoing statewide and regional problem. This problem led to the passage of the Williamson Act in 1965 following documentation of the loss of large amounts of agricultural land — over one million acres of prime agricultural land to development in California between 1945 and 1968 (*The Williamson Act 25 years of Land Conservation*, The Resources Agency and California Department of Conservation. December, 1990, p. 9). The nature of the problem is summarized in the following excerpt from the above cited publication. "While the threat was greatest to the prime agricultural lands located on the outskirts of cities, it also appeared in more remote areas where country subdivisions and large lot homesites were the principle signs of development." The Williamson Act is discussed further in the subsequent section.

Locally, the participants in the General Plan Technical Scoping Session (3/27/92) also expressed concern about conversion of agricultural lands. A Sierra Valley rancher stated that it requires far more cattle and thus more acres to have a viable operation today, and yet lot splits for home sites are creating smaller ranches. Holly George, of the U.C. Cooperative Extension Office stated that Plumas County Agricultural Zoning, based on a chosen level of soil productivity, has been undermined and repeatedly changed because of technical challenges to the soil ratings at individual sites. Technical scoping session participants observed that even marginally productive lands make up the large holdings that constitute functioning ranches. Sierra County Planning Director Tim Beals has observed increasing pressure to subdivide grazing lands, particularly those on the terraces above the Valley floor.

These trends indicate that Sierra County agriculture may experience some of the same conversion pressure experienced throughout the State and region.

It should be noted that ranches in Sierra County do experience needs for added dwellings housing family members and for farm, employee housing. These types of housing do not necessarily increase the pressure to convert agricultural lands, and may even ease that pressure to the extent that they make farming more viable.



**The California Land Conservation Act** ~The California Land Conservation Act, Commonly known as the Williamson Act, is a program in which landowners can enroll their land in minimum ten year contracts with the County and receive lower property taxes based on agriculture and open space uses rather than on a higher market value. The Contracts are automatically renewed each year for an additional period of ten (10) years. The State partially supports the local costs of administering the Act, and replaces a portion of the foregone local property tax revenue through to administration of the Open Space-Subvention Act (*The Williamson Act 1990-91 Status Report*, California Department of Conservation, March 1992, p. 3).

The principal means of terminating a Williamson Act contract is for the landowners or County to file a notice of non-renewal which starts a nine-year phaseout of the contract. Under extra-ordinary circumstances, the local agency can cancel a contract which results in its immediate termination. The selected officials must make findings that the cancellation is either consistent with the Williamson Act or is in the public interest. To be consistent with the Act a cancellation must have the following characteristics (California Department of Conservation and The Resources Agency, *The Williamson Act, 25 Years of Land Conservation*, December, 1990):

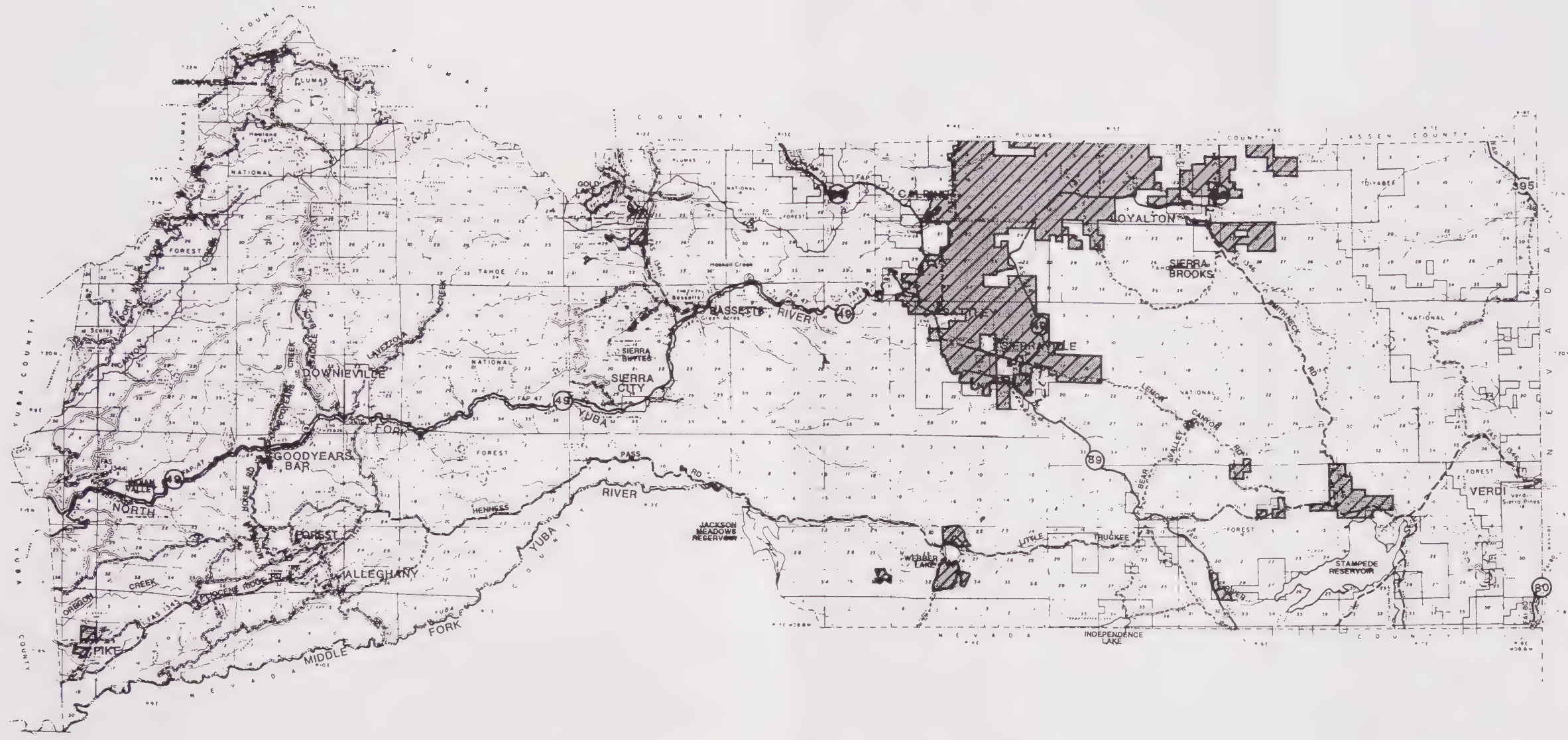
(1) an alternative use is specified which is consistent with local general plans; (2) the removal of adjacent lands from agriculture is not likely to result; (3) discontinuous urban development will not result; and (4) there is no nearby noncontracted land available for the alternative use.

The Williamson Act gives cities and counties the authority to create rules governing the administration of the act. Minimum eligible parcel size and types of compatible use are examples of issues that can be decided by local agencies. The contracted Williamson Act lands in Sierra County are shown on Figure 10-4. As shown, most of those lands are within Sierra Valley; other locations include Sardine Valley, the Webber Lake area, a location in the Lakes Basin, and a parcel in Pike. Total contracted land in Sierra County was 35,684 acres in Fiscal year 1992-1993, with 1953 of these acres classified as prime. The prime agricultural lands are classified as such based on earnings of at least \$200 per acre for three of the previous five years — they are primarily alfalfa or wheat fields in the Sattley, Sierraville, and Loyalton areas (Bill Copren, Sierra County Assessor, personal communication 3/23/93).



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 SIERRA COUNTY  
 WILLIAMSON ACT LANDS

SCALE IN MILES









The County currently has 1359 acres in non-renewal (Bill Copren, County Assessor, Personal Communication, 5/3/93).

**Urban/Agri-  
culture  
Conflict**

**General** ~ One of the manifestations of agricultural land conversion is increasing frequency of conflicts between urban and agricultural landuses. These conflicts normally involve complaints by residents about normal agricultural practices, such as odor, aerial spraying, noise, and the presence of grazing cattle. These types of complaints can put pressure on the rancher to modify or curtail activities. These pressures have led to right to farm ordinances in other communities.

A second type of related use conflict noted in the technical scoping sessions is between agriculture-related quasi-industrial uses, such as vehicle storage and repair, and residences. The principal complaints that occur are the visual degradation and hours of operation.

**Open Range** ~ A particular type of urban/agricultural conflict occurs when cattle on previously open range encounters residences or when cattle operations fail to properly control their animals. Both situations have occurred in the County.

**Wildlife/Agri-  
culture  
conflict**

In Sierra Valley, agriculture has been relatively stable, and this has led to an apparent coexistence between wildlife and agriculture. Agriculture can disrupt or weaken wildlife by altering native vegetation, causing the erection of fences which can act as barriers to migration, altering water courses, and other actions. Conversely, wildlife can interfere with agricultural productivity through deer browsing on pasture grasses, and through requirements for instream flows.

**Visual Benefits of Agriculture** The agricultural lands of Sierra County are a significant scenic resource. This issue is discussed in the Visual Resources Element.



## Related Plans

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The County's zoning ordinance has an Agricultural District in which the minimum parcel size is 160 acres. This District is applied in the Sierra Valley, Sardine Valley, and Balls Ranch/Long Valley areas. The County also recently passed a "Policy Supporting Natural Resource Industries in Sierra County" which identifies farming as one of several traditional and on-going resource extraction uses. Approximately 75% of the County is under the jurisdiction of three National Forests — Tahoe, Plumas, and Toiyabe. The majority of the forest land in the County is within the Tahoe National Forest. The following excerpts from the *Tahoe National Forest Land and Resource Management Plan* (1990) indicate the general approach to range management (p. V-9):

### **Goals and Desired Future Conditions**

#### **FORAGE AND WOOD RESOURCES**

1. Emphasize vegetative management systems that will stop downward trends in range vegetative condition and improve those sites that may already be in a degraded state.
2. Maintain or enhance the production of forage and wood fiber.
3. Emphasize economic uses of TNF resources, including timber harvesting, mining, and grazing that are compatible with other resource and amenity values.

#### **Desired Future Condition**

**Ninety-five percent of all rangelands will be brought to satisfactory condition. Management plans will be approved for all grazed allotments.** (p. V-9).

Note: Only the grazing-related direction reprinted.

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Specific management practices including the permitting process for range allotments are also described in the Plan; directives are given for different range types and for intensive and extensive management techniques. Intensive management can involve range improvements such as seeding, fencing, and water developments. Use may be suspended on degraded lands.



**MINERAL  
MANAGEMENT  
ELEMENT**



**GENERAL PLAN  
2012**









JULY, 1996

## 11. Mineral Management Element

### Background Discussion

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The Background Discussion section of this Element was prepared with the assistance of mining engineer Jack Havard.

**General Geology** Sierra County resembles consists of two different geographic provinces. The western part is extremely mountainous because it is a section of the Sierra Nevada, whereas the eastern part includes agricultural valleys and a chaotic volcanic terrain. The two parts are separated by the major Sierra Nevada Fault as described below. These geologic differences have lead to contrasting economic interests, the west emphasizing logging and mining and the east emphasizing agriculture. Both regions are attractive to tourists and vacationers. The high mountains, deep canyons, broad valleys and volcanic terrain all combine to form a county noted for the beauty and variety of its scenery.

The alignment of the County's structural features is generally north-south, so the westbound North and Middle Yuba Rivers must cut across the mountains in order to flow eventually into the Sacramento Valley. The North Yuba River



canyon provides a route for the County's important east-west highway, State Highway 49. The Middle Yuba, which is much less accessible to the west, provides half of the boundary with Nevada County on the south. Many streams flow into the two branches of the Yuba, but streams in the eastern part of the County flow mostly into the Feather River system.

Elevations range from about 1,500 feet above sea level where the Middle Fork enters Yuba County to heights of 8,587 at the summit of the Sierra Buttes and 8,760 at Babbitt Peak in the extreme eastern part of the County. (Mt. Lola, its peak only a mile south in Nevada County, reaches 9,143 feet.)

Great faults are also a significant feature of the geology of Sierra County, striking northerly and southerly and profoundly affecting both the scenery and the valuable mineral deposits. The Melones fault zone is recognized as a major suture of the earth's surface, a result of the thrusting of the Pacific Plate under the North American Plate. The zone is bounded on the east by the Melones Fault itself and on the west by the Goodyears Creek Fault, defining a width for the zone of about four miles along Highway 49. Elongated masses of serpentinite accompany the faults.

The great Sierra fault system is strikingly visible in the sharp drop from Yuba Pass to the Sierra Valley. Some geologists believe that this valley occupies a graben, or down-faulted block, which is a northern extension of the graben occupied by Lake Tahoe.

The basement rocks of western Sierra County are divided by the Melones fault zone. Those to the east are the continentally derived rocks of the Silurian Shoo Fly Formation, predominantly quartzite and mica schist. Those to the west are the marine-deposited rocks of the Pennsylvanian Calaveras Formation, mostly phyllite with some quartzite, metachert and marble. These formations formed part of the core of the ancient Sierra Nevada mountains, which were worn down over millions of years. The Shoo Fly and Calaveras rocks were intruded by granitic plutons which penetrated upward from deep-seated magmas 120 to 80 million years ago, probably related to the gigantic slow movement of the Pacific Plate forcing itself eastward under the North American Plate as proposed under modern tectonic theory.

The worn and flattened old Sierra were incised by the early Tertiary rivers, which transported sand and gravel — and accompanying native gold — originating in the higher areas to the east. All of this flattened terrain was then covered by enormous flows of volcanic debris from the east. This debris filled the valleys of the Tertiary streams. Occasional new river channels deposited



gold-bearing gravels in the volcanic rocks, leaving the "inter-volcanic channels," as they are called today.

Finally, within the last five million years, the great Sierra Nevada Range rose as a tilted block with a steep faulted east slope and a broad gentle west slope. The rivers readjusted into their present courses and proceeded to cut the deep valleys and gorges seen today.

The last spectacular stage in the epic history of the County's geology was glaciation, which took place in the last few thousand years in the higher mountains. Glaciation is most evident in the high-elevation plateau-like area east of the Sierra Buttes, an area notable for glacial drift (poorly sorted gravels) and picturesque lakes.

## **Economic Geology**

The geology of the western part of Sierra County is well suited for hosting metalliferous mineral deposits. This geology includes a variety of rock formations, extensive faulting (both large and small scale), granitic intrusions and a history of deep erosion. Gold is the predominant economic metal; other metals either accompany gold or are economic curiosities, and several industrial minerals have been mined on a small scale. It is important to protect these resources to the maximum extent possible and consistent with other goals of the General Plan to ensure their availability in the future.

The types of gold deposits are:

1. ***Present streams.*** The present streams lured the Forty-Niners by gold found in the stream beds. Prospecting was easy — just pan for gold — but the living conditions were tough in a primitive country. The first simple pans, rockers and sluice boxes were followed by dredges and by elaborate dams and recovery systems. Today the big stream placers have been depleted and gold mining in the stream beds is done mostly, but not entirely, by casual miners who take advantage of fresh seasonal deposition, especially after periods of flooding.
2. ***Tertiary gravels.*** Some 50 million years ago a river system started draining the well-worn Sierra Nevada, flowing westerly in somewhat the same manner as the present Yuba River system. The rivers cut through gold-bearing formations and then at lower elevations deposited the gold, sometimes in rich little pockets and sometimes in broad delta-like low-grade deposits. Vigorous volcanic action to the east buried these rivers with effusive rocks and ash flows. In periods of quiescence between eruptions, the rivers, still carrying gold, reasserted themselves in inter-



volcanic channels. Eventually these, too, were covered by volcanic debris.

With the erection of the modern Sierra Nevada, the present Yuba Rivers developed in the long westward-sloping surface of the rising mountains. The rivers were persistent and cut deeply down through the volcanic cover, into the old Tertiary river gravels, into the granitic rocks and into the metamorphosed formations of the Paleozoic and Mesozoic eras.

When the pioneer placer miners in Sierra County had exhausted the richest of the modern stream gravels for gold, they turned their attention to the ancient Tertiary gravels which they found exposed on the hillsides and elsewhere. They mined these gravels by surface means wherever possible. Some of the more ingenious miners, with more capital funds, developed hydraulic mining, using powerful streams of water to strip the upper low-grade gravels and to send the lower higher-grade gravels coursing through sluice boxes for recovery. The washed material reached the rivers and travelled into the Sacramento Valley, ruining farm land and silting the navigable rivers. Large-scale hydraulic mining was summarily halted by the decision of Federal Judge Alonzo Sawyer, in 1884, prohibiting discharge of hydraulic mining debris into the river system.

Meanwhile miners traced the old Tertiary gravels underneath the largely volcanic cover and began mining them by underground methods. This technology reached its peak in Sierra County, and the underground gravels are still being mined and are the subject of further exploration.

3. **Lodes.** Outcrops of gold-bearing rock in place led to hard-rock lode mining throughout the western part of the County from the Sierra Buttes to the Yuba County line. Some of the lode mines were rich producers and became famous. These mines were "pocket" gold mines, meaning that the gold ore was found generally in small rich pockets as compared to the lower grade but much more extensive "ore shoots" of the Grass Valley district. Lode gold mining and exploration continues on a small scale in the county, handicapped by the relative low price of gold at this time.

The geology of Sierra County is conducive to lode gold deposits — the extensive faulting, the intrusion of granite and the presence of great lenses of serpentinite. The faults provide passage for rising metal-bearing solutions, the granite plutons release the fluids and the heat for the driving force, and the impervious serpentinite guides the solutions



and perhaps contributes a chemical reaction that helps precipitate the vein-making minerals.

Anomalous occurrences of gold and other metals are found in the volcanic rocks of the eastern down-faulted part of the County. A few miles south of Loyalton, on the edge of Antelope Valley, a major exploration program has been completed on a series of silicified and auriferous "domes." This area may not only support an operating open-pit mine but might also provide clues to other metalliferous deposits in the eastern county. The Antelope Valley deposits apparently belong to the "Walker Lake" zone of Nevada rather than the "Northern Mines" of the Sierra Nevada.

The Antelope Valley deposits were prospected as early as 1862 by miners who were attracted by oxide copper minerals in the outcrops. No commercial copper was developed and eventually the attention was shifted to the elusive but much more promising gold deposits.

The most complete historical description of mining in Sierra County is presented in the *California Journal of Mines and Geology*, State Division of Mines, 1942, by Charles V. Averill. Another source of detailed information is *Mines and Mineral Resources of Sierra County*, by Errol MacBoyle In: *California State Mineralogist's Report XVI*, 1918.

The report carries a "Table of Mines and Prospects, Sierra County, with References to Reports of State Mineralogist." This list would be little altered today because there have been few finds which are entirely new since 1942. A summary of these data follows in Table 11-2:

**Table 11-1**  
**SIERRA COUNTY TABLE OF MINES AND PROSPECTS<sup>1</sup>**

Gold		
	Quartz	263
	Placer	282
Other		
	Chromium	15
	Asbestos	2
	Copper	2
	Iron	1
<b>Total Mines and Prospects</b>		<b>565</b>

<sup>1</sup> This is not a summary of the number of mining claims.

SOURCE: State Division of Mines, C.V. Averill. *California*  
"Table of Mines and Prospects, Sierra County"  
**11 - 5** *Journal of Mines and Geology*. 1942



Figure 11-1 maps the larger existing operating or semi-active mines in the County.

- **Gold** - Discussed previously; the predominant economic metal in the County.
- **Chromium** ores have been found in small pods in serpentinite. Small tonnages were mined during World War I and World War II. The mines and prospects are idle now because no wartime subsidies are available and because the poor deposits in the United States cannot compete with the enormous rich reserves of South Africa, by far the world's largest, and of Zimbabwe, Russia and Turkey.
- **Asbestos** is often found in serpentinite. Three groups of claims are described by Averill. No production is indicated. Environmental and health regulations nowadays would make asbestos mining and processing extremely difficult, the market is shrinking and small isolated deposits are not competitive.



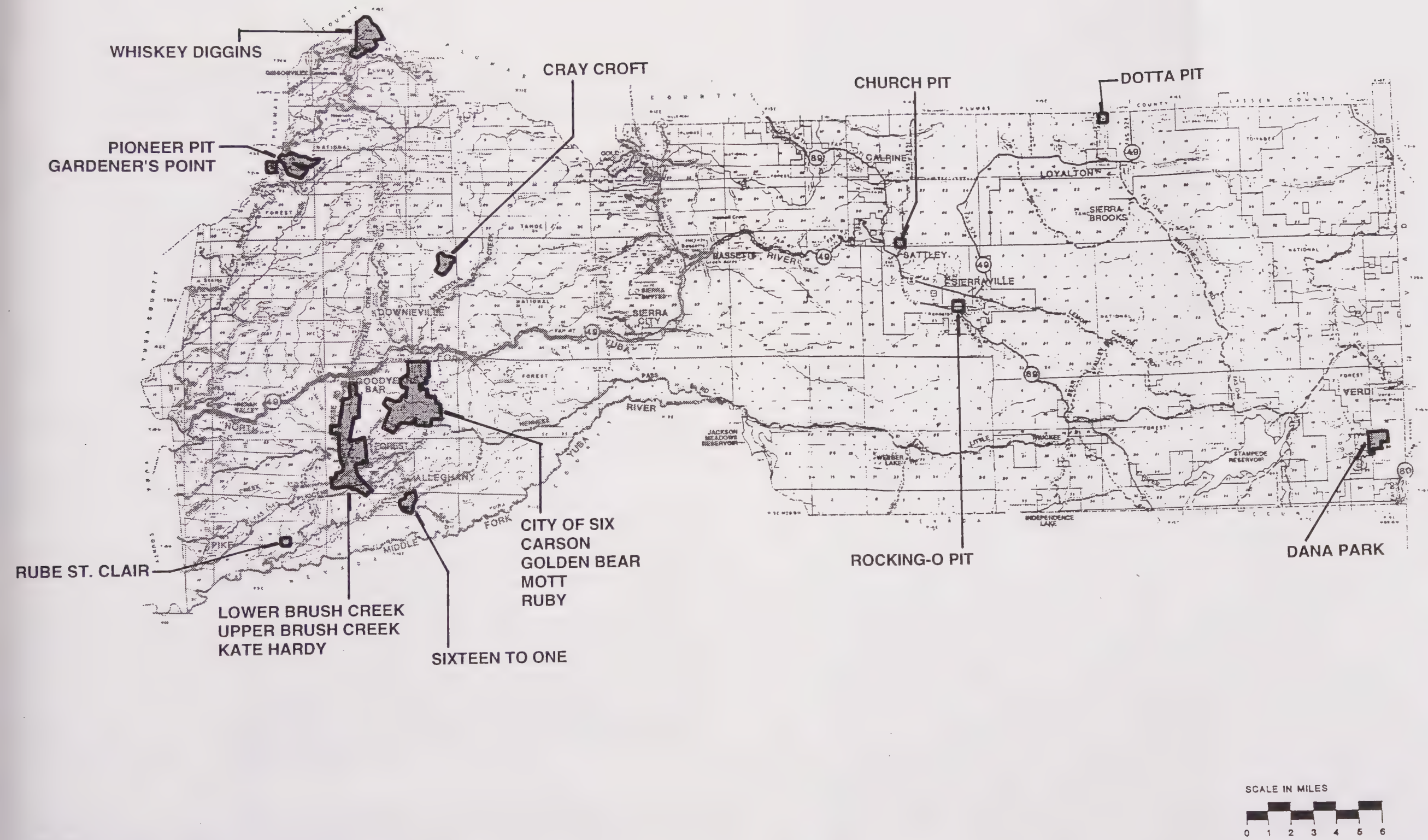
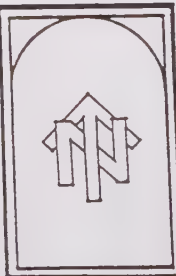


FIGURE 11-1  
EXISTING OPERATING & SEMI-ACTIVE MINES









- **Copper** is listed by MacBoyle in six prospects. Little or no copper ore has been mined and shipped. Judging from the vast amount of prospecting accomplished in the County, there is little hope of finding a large competitive copper deposit.
- **Iron** ore (magnetite) has been located in northern Sierra County near Spencer Lakes and Lake Hawley. Averill states that the Sierra Iron Company of San Francisco owned patented claims covering a length of 9,000 feet and a width of one-fourth mile. The reserves are reported to be small and consequently would be non-economic today.
- **Other minerals** which have been reported in the County and might prove exploitable in the future are limestone and marble, pipe clay, quartz and perhaps other industrial minerals not yet identified.
- **Aggregates** are mined as needed from stream and river gravels and a number of small pits are located throughout the County. Two small but permanent plants are operated as required. Portable plants supply aggregate for road construction.
- **Geothermal resources** of the Sierra Valley have attracted interest in recent years, and test wells have been drilled. Large quantities of warm waters have been produced but so far no use has been found due to a number of possible factors, including relatively low temperatures, lack of large quantities of available fresh water, and various industrial locational considerations. Regardless of results to date, the water resources of the Sierra Valley will prove of increasing importance to the County. Because use of geothermal resources requires surface disturbance and other operations similar to mining operations and because it is important to protect these resources from conflicting land uses, geothermal resources are considered a mineral resource in this Element subject to the same safeguards and regulations as other mineral resources.

#### **Mining on Federal Lands**

The United States Forest Service controls 285,000 acres in Sierra County, amounting to 47% of the County area of just over 600,000 acres; however, the Forest Service controls 75% of the western part of the County.



The Forest Service mining program is administered in Sierra County by a specialist, Richard S. Zembiac, Minerals Officer in the Camptonville Ranger Station. As of August, 1991, a total of 7,326 legal mining claims were situated in the Camptonville District, with about 6,000 of these in Sierra County. Mr. Zembiac reports a steady gain in claims since 1980-81 with an annual increase of 10-12% since 1988. "Legal" claims means the claims have legal paper trails but have not been field inspected for actual validity in terms of discovery, assessment work and the "prudent man" concept. The Forest Service does not possess the manpower to conduct such field inspections and to face the legal problems for invalidation of claims except in the most flagrant cases.

The claim mix is changing. The 1942 list of mines and prospects in the County, referred to earlier in this section, shows half placers and half lodes. Today, the Forest Service estimates that Tertiary placer claims account for about 65% of the proposed operations.

The Camptonville office has on hand over 2,000 Plans of Operations meeting requirements above the annual assessment work required on unpatented claims. Of this number, there are 1,024 active plans in the ranger district, some seasonal, some intermittent, the majority using only two or three men when active.

## **Mining on Private Lands**

Private land ownership is also substantial and concentrated. Sierra Pacific Corporation owns 54,000 acres in the County, held primarily for timber growing and harvesting. This acreage amounts to 9% of the County and about 15% of the western part of the County. Mineral rights under all of this land have been obtained by a variety of arrangements and are administered by Sierra Pacific Minerals Corporation and its subsidiary Sierra Pacific Mining Inc. The company holds no mining claims on federal land. Accordingly, it is taxed on timberland, not on minerals. It conducts no mining operations in the County, although it recently accomplished a small amount of exploratory drilling on land near Antelope Valley. It has no plans for mineral exploration and development in the County. The mining company is active in other states where it considers laws, regulations and attitudes more favorable than in California.

Many patented mining claims are found in the County. Operations on some of these claims could be significant, such as the Plumbago Mine, intermittently worked but now inactive.



A small percentage of the County is owned by mining companies as patented claims or fee land. Another small percentage is owned by communities, householders and the State.

If the price of gold should climb and hold strongly at \$450 a troy ounce or higher, a renewal of exploration can be expected. Even now some small scale exploration is being conducted by individuals. The prospects are slim for entirely new mine discoveries. New mining claims are usually located over lapsed claims, or claims are leased or purchased. Rather than entirely new discoveries, growth of mining in Sierra County would depend upon the development of known properties by private companies with expertise and capital. Tertiary gravels will be worked with better open-pit equipment, better underground equipment and better exploration methods. Lode mines may be consolidated in group ownerships, mined more skillfully with modern underground equipment and backed up by central concentrators. Sierra County probably will not host a huge mining operation with thousands of employees, but it is conceivable that the County could benefit from one or more moderate sized operations, each employing around a hundred people. This would be a substantial addition to the 1991 total labor force of 1,675 persons, of which 175 were unemployed.

In Sierra County the tributaries of the old Yuba River are widespread in the western part of the County. A working drawing made by the late L.L. Huelsdonk, one-time manager of the Ruby Mine in its heyday and perhaps the most knowledgeable student of the Tertiary gravels since Waldemar Lingren, shows a dozen or so Tertiary streams, tributaries and fragments coursing southerly across this part of the Sierra Nevada and, of course, repeatedly cut and revealed by the present stream system. The Tertiary streams can also exist in "layers" — intervolcanic channels. These Tertiary placers are easy to find, often do not require extensive exploration and are easy to work, first by open-pit methods and then by underground methods. The mining is directed at the "gutter" of the stream (the "gut" as the miners call it) but values are sometimes found on ancient benches and elsewhere. Underground room-and-pillar operations are possible because the lower gravels are usually cemented, sometimes so thoroughly as to behave like homogenous rock.

Lode mines usually require more exploration, need more skilled miners and present more technical mining problems. Yet pockets can be found and can be rich.

Confidence in the mining future of the County is being demonstrated by the managements of several famous properties:



- ***Brush Creek Mining and Development, Inc.*** has established a project incorporating thirteen former producing mines in or near the Melones Fault Zone of the Alleghany/Downieville district. The company now owns such lode mines as the Brush Creek and Kate Hardy and is optimistic of locating ore shoots at greater depths than have hitherto been mined. Detailed surveying and geologic mapping has been accomplished on several mines of the group. Attention is also being paid to the Tertiary placers, starting with the famous Ruby Mine, a stupendous producer of underground placer gold and of some remarkable nuggets. The company renewed mining of the Ruby in 1991 at about 100 tons a day, will soon produce 200 tons a day and has set a target of 1,200 tons a day. Lode gold veins have been found in the process of mining Tertiary gravels.
- ***The Sixteen-to-One Mine***, perhaps the most noted of all the Sierra County mines, has been vigorously explored for over ten years by several companies. It is now completely back in the hands of the original Sixteen-to-One Company. Metal detectors have recently identified unmined gold in old slope walls and waste piles, yielding substantial profits which will be used for further underground exploration.
- ***The Oriental Mine*** is the subject of renewed underground exploration based upon the results of extensive drilling.
- ***Tenneco Minerals and previously by Hecla Mining Company***, has recently been conducting a major exploration program, on the Antelope Valley deposits near Loyalton. Reports are that an open-pit heap-leach mine could be developed there.

## Environmental Protection and Reclamation

Environmental protection and reclamation are inherent parts of mine planning today. In recent years mine operators have learned that such practices can be economical and that lack of such practices results in problems which carry heavy penalties.

The mining industry of Sierra County is basically regulated by two government entities: The U.S Forest Service and Sierra County, the latter both as a county unit and as a lead agency for the State with cooperation from the State Department of Fish and Game, the Regional Air Quality Control Board, and the State Water Quality Control Board. Operating mines and also inspected



and regulated by the federal Mine Safety and Health Administration (MSHA) and by Cal OSHA.

### **Federal Control**

The Forest Service in Sierra County controls the mining activities on its land. It receives no fees for its extensive services. It keeps complete records of its mining claims and, so far as possible, the activities on these claims. Each proposed or active mine operation is controlled by the *Plan of Operations on National Forest Land* which includes:

- General Information
- Principals
- Property or Area
- Description of the Operation
- Environmental Protection Measures
  - ~ Air Quality
  - ~ Water Quality
  - ~ Solid Wastes
  - ~ Scenic Values
  - ~ Fish and Wildlife
  - ~ Cultural Resources
  - ~ Hazardous Substances
  - ~ Close-Out Reclamation
- Forest Service Evaluation
  - ~ Bond
- Approval or Disapproval

The Forest Service does not recognize the application of the State Surface Mining and Reclamation Act (SMARA) on its lands though the State feels the Act applies to federal lands.

### **County Regulations**

Sierra County is responsible for the administration of mining laws and regulations on all lands not included in the National Forest. The County is the lead agency for SMARA. Currently it is handicapped because the State Division of Mines and Geology has not yet completed the Mineral Claim Classification report and maps which SMARA requires in order to classify land as mineral or non-mineral without regard to existing land use. Geologists of the Division expect that, because of limited personnel, political priorities and lack of funds, they will not be able to classify Sierra County for years. The job itself took three years in Nevada County. In discussions concerning the SMARA report,



it has been suggested that the immediate need for such a map could be temporarily satisfied by assuming all of Sierra County to be mineralized and appropriate for mineral extraction except for the Highway 49 corridor, the Highway 89 corridor, the Sierra Valley agricultural lands, the Sierra Buttes and recreational lakes area, certain other recreational areas such as the lakes on the Middle Fork and the Little Truckee Rivers, and the Community Areas. Areas with existing mine operations and semi-active operations were recommended for classification in a Mineral Extraction Overlay to protect these uses.

Regardless, the County is obligated to enforce SMARA where it has lead agency jurisdiction. In the Act, surface mining operations include surface work incidental to an underground mine. In the SMARA the Legislature "declares that the extraction of minerals is essential to the continued economic well-being of the state and to the needs of society." The Act reads on:

It is the intent of the Legislature to create and maintain an effective and comprehensive surface mining and reclamation policy with regulation of surface mining operations so as to assure that:

- (a) Adverse environmental effects are prevented or minimized and that mined lands are reclaimed to usable condition which is readily adaptable for alternative land uses.
- (b) The production and conservation of minerals are encouraged, while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment.
- (c) Residential hazards to the public health and safety are eliminated.

### **County Impact Concerns**

The County's concerns relative to the environmental impacts of mining include mining on public as well as private lands. Concerns include:

1. ***Land Use Conflicts.*** Mining operations can conflict with non-mining land uses such as residential and recreational land uses. Noise, visual, and water quality impacts are particular concerns. However, the protection of mining operations and resources from surrounding land uses which could limit operations and expansion in the future is also a concern. This problem has affected the future of mining in more urban counties such as Nevada County.



The bulk of the policies in this Element are intended to protect mineral resources and avoid future land use conflicts. These issues discussed during the General Plan Workshops and it was generally agreed that the entire County should be considered mineralized and subject to mining if conditional use permit, SMARA, and CEQA requirements can be met with the exception of Community Core areas and the special County Regulations section. However, subsurface mining with no surface impacts would be allowed in any area; related surface disturbance such as vents and access would require a conditional use permit in any area of the County. A Mineral Extraction Overlay is created to be used to protect existing operations, proven resources, and semi-active operations. As additional resources are discovered or conditional use permits approved, additional Mineral Extraction Overlays could be added to the Land Use and Zoning Maps.

2. ***Historic Mines.*** Certain existing historic mines (such as those in the La Porte area) have continued remnant erosion and sedimentation problems.
3. ***Prospecting and Exploration.*** Prospecting and exploration phases of mining projects can be impacting. In addition, if the resource does not prove feasible to recover, the County does not receive any offsetting economic benefits. In addition, there is less economic incentive for mine developers to reclaim these exploratory operations than working mines.
4. ***Recreational Mining/Dredging.*** Recreational mining and dredging are important to the County because of the numerous visitors and residents involved in these pursuits. (See Table 11-4 for projected economic impacts) However, river access, law enforcement, public health concerns, and water quality/habitat impacts are among the issues which must be addressed to ensure that these activities are not detrimental to the County. Concerns are both on public and private lands.

Currently, the U.S. Forest Services require a recreational mining permit on its lands. The County requires no permit on private lands but a permit procedure is recommended in this Element to ensure that public health and environmental concerns are addressed.

5. ***Surface Mines.*** Surface mining operations tend to be significantly more impacting than subsurface mines. Reclamation issues become particularly important for surface mining operations; adequate reclamation plans are critical to the future value of these lands for other uses



including recreational use and as viewsheds in addition to mitigating environmental impacts.

6. ***Mining on Public Lands.*** The environmental and land use conflict concerns discussed throughout this Element are issues both on public and private lands. Though the County has no jurisdiction over federal lands, impacts on federal lands can affect private lands and the County as a whole. The County should continue to comment on mining proposals on federal lands consistent with the goals and policies of this Element.
7. ***Reclamation Plans.*** The content and assured implementation of mining reclamation plans are of particular importance to the County. Reclamation plans should address the concerns in this Element, should be accompanied by assurance bonds or other forms of implementation security, and should be designed to provide for future beneficial uses of the area.
8. ***Mitigation Monitoring.*** Monitoring of reclamation plans, mitigation measures, and permit requirements are essential to ensuring that mitigation will take place. The Forest Service charges no fees to miners and prospectors. The SMARA requires annual reports and charges \$50 to \$2,000 for the submission of each annual report to the State Geologist. Bonds or some type of financial responsibility for performance are required by both the Forest Service and SMARA. However, in the past, the County has not had a set monitoring procedure. To ensure on-going monitoring, assurance bonds or other securities and applicant-funded oversight where appropriate are recommended in this Element. Overall, a fee structure is needed that will provide for adequate staff review as well as mitigation monitoring of mining projects. This will assist in protecting the future of mining in Sierra County by ensuring the success of environmental measures recommended.

#### **Future of Mining in Sierra County**

The future of mining in the County rests predominately on its gold deposits. Other minerals may be mined but the impact of such minerals upon the County is expected to be small unless some surprising developments take place.

As this Element is written, the gold price is about \$340 a troy ounce. This is low compared to a previous prevailing price of \$450 an ounce. A peculiar speculation shoved the price over \$800 an ounce in 1980 but recurrence of such a price is not expected in the meaningful future. Current prices are not



stimulating extensive exploration. Nevertheless, there are encouraging developments in Sierra County.

Three trends seem significant:

- 1) A search by major companies for clusters of quartz lode deposits which could be mined by surface methods on a large low-grade scale. So far, two major efforts have been made by well-financed companies but only one was successful in identifying such a mine, although even it is smaller than desired.
- 2) Widespread interest in mining the Tertiary gravels by both surface and underground methods.
- 3) Consolidation of mines under one ownership. This could lead to central gold concentrators, obtaining larger pay-offs from exploration and development and attracting capital.

Confidence in the future is being demonstrated by the management of several famous old properties, specifically by the Brush Creek and Sixteen-to-One managements. In discussing the future, a number of knowledgeable mining people stated that the general attitude towards mining in California and specifically in Sierra County is a major deterrent to new work.

The data in this Element indicate that mining contributes about \$3,000,000 a year to the economy of Sierra County and even in 1992 keeps over 300 people employed. This contribution of mining to the County could be substantially increased if the County developed a larger mercantile establishment so that the industry and its employees could purchase more of their needs in the County.

In summary, the mining industry has great potential for the County, if it is welcomed by its residents. During the General Plan workshops, the idea of Sierra County as a Rural Preserve which would seek to ensure continued reliance on traditional forms of employment such as mining became a theme. Though some offered concerns about over-regulation and hostile attitudes toward mining, there was a general consensus that environmentally sensitive mining is important to the County's future; however, mining proposals must be economically sound and able to meet the environmental standards to avoid environmental and "boom-bust" problems of the past and to protect the diversified future of the County.



**Economic Impact  
of Mining in  
Sierra County**

Mining in the County contributes to the County tax base as well as to its overall economy. The County taxes mines on an ad valorem basis — on the value of each property, including ore reserves, development work, machinery, etc. The base is 1% of the ad valorem value, and changes are controlled by Proposition 13.

The County does not have the manpower or the expertise to actually evaluate ore reserves. The County therefore depends upon the records. For each claim the County assumes a base value of \$5,000 and applies a 1% tax or \$50. This valuation for each claim will be changed by the allowed inflation or by changes in ownership, leases, options, etc. that expose value numbers for a property. A proof of annual assessment work done on claims cannot be submitted to the County Recorder without certification that the taxes have been paid. The only known proven reserves are those at the ex-Tenneco property in Antelope Valley.

If a mine is financially successful the County continues to receive only its 1% tax, perhaps adjusted. However, a wide range of economic benefits spreads out to employees, management, stockholders, suppliers and a multiplicity of service businesses.

The projections of the economic impact of mining in Sierra County is summarized below in Table 11-2. The largest company's contribution is eliminated for 1997 in the parenthesis since it is not clear whether or not these plans will materialize.

**Table 11-2**  
**SUMMARY OF ECONOMIC IMPACT PROJECTIONS OF MINING**  
**IN SIERRA COUNTY<sup>1,2</sup>**

	1992	1997
Number of employees in mining	307	489 (339)
Expenditures by employees in County	\$2,278,000	\$5,820,000 (\$2,670,000)
Expenditures for supplies and materials in County	\$ 230,000	\$ 697,000 (\$ 247,000)
Annual Taxes Paid (excluding taxes on unworked and unpatented claims)	\$ 177,000	\$1,049,000 (\$ 49,700)
<b>Total Economic Impact on County</b>	<b>\$2,689,000</b>	<b>\$7,573,000</b> <b>(2,967,000)</b>

<sup>1</sup> The largest company eliminated indicated in ( )

<sup>2</sup> See Table 11-4 for detailed assumptions

SOURCE: J.F. Havard, August, 1992



Thus, the impact of mining in Sierra County in the fall of 1992 approaches an annual rate of \$3,000,000. The projected annual impact for 1997 exceeds \$7,500,000 if the largest company's plans materialize and remains at \$3,000,000 if this company scales back its plans. In addition, it should be noted that a number of small towns such as Alleghany are almost fully dependent on mining.


Another aspect of a successful mine is its possible role as a tourist attraction in itself. An operating mine which is accessible to the public is extremely interesting to watch, and some mines provide viewing platforms where the public can watch the lively activities of a surface mine or the surface activities of an underground mine. Alleghany's 16-1 Mine's recent successes have made State and National press which has marketed the County's assets.

On the down side, mining operations always have the potential for creation of "boom-bust" employment and economic impacts. Though ups and downs in mining employment in the County are somewhat traditional, the County should continue to be concerned about potential economic impacts to its communities. In particular, large operations which are not phased in have the potential to create a need for increased housing and public facilities and services which cannot be met quickly. Closure of a large operation can result in fiscal impact to the County and economic impacts to entire communities which have geared up to meet the needs of the increased employment force. This is a particular concern when large-scale operations are proposed by out-of-County investors who do not have a long term stake in the community or other operations which can absorb mine-to-mine employment fluctuations. It will be important to evaluate the financial standing and proven resource of large mining operations in the future to determine potential socio-economic impacts and appropriate mitigation.



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# SIERRA COUNTY GENERAL P · L · A · N

**Table 11-3**  
**ECONOMIC IMPACT OF MINING ON SIERRA COUNTY DATA SHEET**

	Larger Companies		Small Companies		Year-Around Dredgers		Seasonal Dredgers		Total		Total Without Largest in 1997	
	1992	1997	1992	1997	1992	1997	1992	1997	1992	1997	1992	1997
1. Number of employees	53	235	92	92	12	12	150	150	307	489	307	339
2. Employees Living In County (%/#)	83% 44	89% 209	90% 83	80% 74	75% 9	75% 9	20% 30	20% 30	166	322	166	172
3. Average Base Hourly Pay	\$13	\$15	\$13	\$15	\$15	\$15	\$5	\$6	-	-	-	-
4. Average Days per Year	250	250	150	150	150	150	100	100	-	-	-	-
5. Annual Base Pay Earnings	\$1,390,000	\$7,050,000	\$1,435,000	\$1,656,000	\$288,000	\$288,000	\$630,000	\$756,000	\$3,743,000	\$9,750,000	\$3,743,000	\$5,250,000
6. Purchases in County (%/\$)	69% \$958,000	61% \$4,304,000	80% \$861,120	60% \$993,600	50% \$144,000	50% \$144,000	50% \$315,000	50% \$378,000	61% \$2,278,000	60% \$5,820,000	2,278,000	\$2,670,000
7. Operating Supplies, etc.	\$1,424,610	\$5,885,000	\$700,000	\$812,000	\$60,000	\$70,000	\$300,000	\$300,000	\$2,425,000	\$7,067,000	\$2,425,000	\$2,567,000
8. Purchases in County (%/\$)	8% \$124,000	9% \$532,000	10% \$70,000	15% \$127,800	10% \$6,000	10% \$7,000	10% \$30,000	10% \$30,000	\$230,000	\$697,000	\$230,000	\$247,000
9. Other Employment	12	54	21	21	3	3	10	10	46	88	46	53
10. Taxable Investment	\$8,530,000	\$13,760,000	\$980,000	\$980,000	\$120,000	\$120,000	\$300,000	\$300,000	\$9,930,000	\$15,160,000	\$9,930,000	\$4,660,000
11. Annual Taxes paid County <sup>1</sup>	\$167,300	\$1,040,000	\$7,000	\$7,000	\$1,200	\$1,200	\$1,500	\$1,500	\$177,000	\$1,049,000	\$177,000	\$49,700
12. Economic Impact on County <sup>2</sup>	\$1,249,000	\$5,876,000	\$942,000	\$1,129,000	\$15,000	\$158,000	\$347,000	\$410,000	\$2,689,000	\$7,573,000	\$2,689,000	\$2,967,000
13. Employment Involved <sup>3</sup>	62	289	113	113	15	15	160	160	350	577	350	392
14. Population Involved <sup>4</sup>	x3 186	x3 867	x3 339	x3 339	x3 45	x3 45	x2 320	320	890	1571	890	704
15. Number Companies & Units	3	4	28	28	6	6	75	75	112	113	112	112

**Notes**

<sup>1</sup> Excludes taxes on unworked, unpatented claims.

<sup>2</sup> Add lines 6, 8, 11

<sup>3</sup> Add lines 1+9

<sup>4</sup> Line 13 x3 or x2

Assumptions: Price of gold is about \$340 per troy ounce in August, 1992. It is assumed to rise to \$450 an ounce in 1997, an inflation of 32% or 6.4% per year. Cost inflation where applicable is estimated at 3% per year or 16% for five years (See Columns 9 and 10 above for totals of all categories.) This table illustrates the largest company has been withdrawn (Year 1997). It is assumed that the estimates by the large companies are optimistic; withdrawing the largest, which is predominant in the figures, yields a group of conservative figures. The chief incentive to do this is that the largest company is dependent on raising nearly \$100 million. Taxes on unworked and unpatented mining claims are not included. These could exceed \$100 thousand annually. The year 1992 is the August activity extrapolated for 12 months.

SOURCE: J. F. Havard, August 1992



**Table 11-4**  
**ECONOMIC IMPACT OF MINING ON SIERRA COUNTY DATA SHEET**

Criteria

**1. Number employees:**

Larger Companies - direct interviews w/executives

Small Companies - Dick Zembiac, USFS;  
 direct County staff

Year-around Dredgers - Dick Zembiac estimate

Seasonal Dredgers - Dick Zembiac estimate  
 (difficult)

Note: No change in number of employees in small companies and dredgers in 1997 because it is assumed that with gold at \$450 an ounce and increased population the level of activity will be about the same.

**2. Number of Employees Living in County.** No reliable data is available. The guesses range from 83% of the larger company employees in 1992 to 20% of the seasonal dredgers.

**3. Average Base Hourly Pay (without social security, pensions, etc.).** For companies the figures are close; for dredgers it is assumed they make the equivalent of wages on the average, except for seasonal dredgers.

**4. Average Days per Year.** Estimates from knowledgeable persons.

**5. Annual Base Pay earnings.** Calculated

**6. %/\$ Purchased by Employees.** No data available - guesses made.

**7. Operating Supplies/Materials.** An estimate based largely on percentage of payroll.

**8. %/\$ Purchases in County of Supplies/ Materials.** Supports a small mercantile business so most goods are purchased outside of County.

**9. Other employment.** An accepted government figure in Sierra County is 0.23 support people for each mining employee. (Sierra Economic Development Dist. from California Dept. of Commerce)

**10. Taxable Investment.** Provided by officers of the larger companies. Estimated for the other operations after discussions with knowledgeable people.

**11. Annual Taxes paid County.** Estimated after general discussions with County staff, but does not represent actual figures, and does not include taxes or unworked, unpatented claims which could exceed \$100 thousand annually.

**12. Economic Impact on County.** Add employee expenditures in County (line 6), Company expenditures in County (line 8), and Annual taxes paid County (line 11).

**13. Employment.** Add lines 1 and 9.

**14. Population involved.** Multiply first three categories by 3 persons in family; multiply seasonal dredgers by only 2 persons per family.

**15. The number of companies and units in each category.**



**CULTURAL  
RESOURCES  
ELEMENT**



**GENERAL PLAN  
2012**









JULY, 1996

## 12. Cultural Resources Element

### Background Report

#### Issues

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##### **Primary Issues**

The need to fully inventory the County's cultural resources and the need to develop methods to ensure the protection of these sites were the central areas of concern discussed during the general plan process. More specifically, the following issues were identified during General Plan Issues Workshops, by County staff, by other interested agencies, or the County's planning consultants, or by those attending the Cultural Resources Technical Session:



The key issues are more fully discussed in the Background Discussion section and the resolution of issues is noted in a policy/implementation measure reference after each issue.

**Table 12-1  
SIERRA COUNTY CULTURAL  
RESOURCES ISSUES**

Rural Appearance	<p>How to define historic areas is an issue; the County's rural communities as a whole may be considered historic areas.</p> <p>Views of traditional rural scenery are important.</p> <p>Incremental changes in these rural vistas which provide "snapshots" into the historic appearance of the County is a concern.</p>
Protection of Historic Views	<p>The loss of Loyalton's historic appearance is a concern.</p> <p>Whether or not to develop design review standards governing historic areas is an issue.</p>
How to Protect Historic/ Prehistoric Resources	<p>Enforcement is weak. Can private property owners be kept from removing structures even if they are not applying for a development permit?</p> <p>National Register districts have not been defined for the County, though there are some within the National Forests.</p>
Protection of Historic	<p>There is no data collection method or other implementation measures beyond site identification currently.</p> <p>There is no funding for a comprehensive inventory. (See</p> <p>There is little consistency between local, State, and federal agencies regarding historic resources.</p> <p>Education/public awareness is needed.</p> <p>The State, in particular, provides no direction governing historic areas.</p> <p>The County does not have an organized review procedure for impacts to historic/prehistoric resources. As a result, the determination whether or not a site is historic can be left to the whim of politics.</p> <p>Vandalism of prehistoric sites and particularly the more visible historic sites such as mining town sites and mine remains is a concern.</p> <p>The Forest Service (and others) often destroy a site in analyzing it.</p>



Site Inventory	<p>The County has sites which need to be identified and evaluated; how to accomplish a thorough inventory is an issue. Cooperation with the Forest Service is needed. The County started an inventory at one time and has an agreement with the Forest Service that the County will act as a repository. However, due to lack of staff time, the inventory was not completed. Another option is greater use of the North Central Information service.</p> <p>Confidentiality of sites is a concern.</p> <p>Is it mitigation if a site has been identified, duly recorded, and then destroyed?</p>
Demolition	<p>Whether or not to make demolition restrictions stricter is an issue.</p>
Barns/Outbuildings	<p>Are historic outbuildings a resource? Photos could be used to record and inventory barns.</p> <p>Maintenance of historic barn structures may be needed.</p> <p>Grants/funding assistance may be necessary.</p>
Compatibility with Economic Activity	<p>Economic activity consistent with historic areas needs to be identified.</p> <p>How can we preserve historic sites which are still active including agricultural areas and mining operations?</p> <p>As technology advances, equipment will change and historic structures may not be needed. This is a particular concern related to Sierra Valley barns.</p>
Adjacent Land Uses	<p>New land uses can intrude on historic land uses and degrade their scenic value.</p>
Historic Papers/Artifacts	<p>A County archive room may be needed. The County has extensive historic maps and records which are not currently kept in state-of-art storage conditions.</p> <p>The County museum does not have curation status which allows for many artifacts to be curated out of the County.</p>
Coordination with Other Agencies, Tribal Councils	<p>Little coordination with the Forest Service, tribal councils, and the State Native American Heritage Commission has occurred in the past. (See P15, IM 8d)</p> <p>Of what importance are "Indian Allotment" parcels?</p>



## Background Discussion

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### Pre-history

Sierra County has a rich prehistoric and historic background. Archaeological studies indicate that native people located in the area soon after the last glacial age, approximately 10,000 years ago (Tahoe Forest Plan, 1990, p. III-7).

The letter report prepared for the General Plan by the North Central Information Center indicated that during early phases, human population in the eastern and crest regions of the County seems to have been light. By 2000 BC, a large population existed with a subsistence emphasis on hunting and seed use. Later phases may have had an emphasis on fishing and seed/nut use due to a change in climatic conditions.

[The following paragraphs are also summarized from the North Central Information Center letter report (11/15/91)].

At the time of the first Euro-American contact (of trappers in the early 1800's), the eastern slopes of the Sierra Nevada, from Honey Lake on the north to the Sierra Valley, including all of the Tahoe Basin to Sonora Pass, was occupied by the Hokan-speaking Washoe. In the northeastern corner of Sierra County, the neighbors of the Washoe were the Penutian-speaking northeastern Maidu, while the people to the west were the Nisenan. The crest zone appears to have been inhabited by both Nisenan and Washoe.

The Washoe migrated with the seasons based on available food. This round of subsistence activities resulted in the location of major Washoe habitation centers within the lower elevation valleys during winter months where water, vegetation and game were relatively abundant. Upon the arrival of spring, they migrated up to Lake Tahoe and other lakes for a period of intense fishing during the spring spawn. During the seasonal movement, small independent, family-oriented groups ranged from the valley floors to uplands in pursuit of the various resources, while temporarily occupying small base camps.



The Truckee River and its subsidiaries were the principal fishing areas of the northern Washoe. Fishing provided the most predictable and consistent source of year-round food in the prehistoric diet and early historic Washoe diet. Roots, bulbs, fruits, seeds, acorns and pine nuts were the common plant food sources.

It appears that the human carrying capacity of the Washoe territory on the eastern crest of the Sierra Nevada and within the northern valleys was less than that of their southern and western neighbors. Consequently, the Washoe had lower population densities and smaller settlements than other Native California groups.

The Hill Nisenan occupied the Yuba River drainage. The Hill Nisenan were based in the foothills and used a diversity of resources there and in the higher elevations. Permanent winter villages were in the lower elevation foothills. Carlson writes:

With base villages situated just below the snowline, resources were available year round, yet many Hill Nisenan chose to move up into the montane areas during spring and summer months for seasonally available plant and animal resources. Autumn hunting and the annual acorn harvest brought most of the Nisenan together again to the permanent villages where they wintered (Carlson, 1986:5 in North-Central Information letter report of 11/15/91).

Hill Nisenan villages were located on ridges and large flats along major streams. Houses were conical-shaped and covered with slabs of bark, skins, and brush. Dance houses were located in major villages. Most villages had bedrock mortar sites associated with them and the availability of water and food resources dictated the location of village sites.

The Nisenan subsistence strategy was based on the seasonal availability of resources, with hunting, fishing and gathering as year round activities. Faunal resources exploited in the foothill region included insects, waterfowl, and fish, in addition to large and small vertebrates. Deer, antelope, and elk were hunted as well as black bear, bobcat, rabbits, squirrels, wood rats, and other small game. Steelhead, salmon, suckers, and trout were fished. Insects gathered included earthworms, grasshoppers, yellowjacket larvae, and grubs.

Floral resources exploited by the Nisenan include nuts, seeds, roots, leaves, and fungi. Edible plants used included miner's lettuce, clover, Brodiaea, soaproot, grass seeds, wild plum and grape, elderberry, manzanita berry, pine nuts, and acorns to name a few. Pine nuts favored were those of the grey pine, also known as the Digger pine. Acorns are considered to have been the



principal staple food of the Nisenan; acorns of the blue oak, black oak, and live oak were favored. The acorns were gathered in the fall months and stored for later use. They were shelled and ground in mortars, usually bedrock mortars, into a flour. The flour was then leached of its bitter tannic acid before cooking.

## **Recorded Pre-historic Sites**

A total of 243 prehistoric sites and 56 prehistoric sites with historic components have been recorded with the State Archaeological Inventory in Sierra County. Of the prehistoric sites, 119 are lithic scatters, 57 are lithic scatters with bedrock mortars, 14 are isolated bedrock mortars, and 50 are multi-feature sites which are either villages, small campsites, or petroglyphs (North-Central Information Center, Letter Report, 11/15/91). It should be noted that many sites which have been located within the County (including numerous National Forest sites have not been recorded with the State Inventory; some have not been submitted, others may be backlogged. However, sites located by professional archaeologists and historians must be recorded with the State Inventory.

Within the Tahoe National Forest (of which about 25% has been examined) 650 prehistoric sites have been identified including three sites listed on the National Register:

- Hawley Lake Petroglyph Site
- Kyburz Flat Archaeological Site
- Sardine Valley Archaeological Site

(Tahoe Forest Plan, 1990, p. III-7)

These sites have not been designated as Special Interest Areas by the Forest Service which may limit their protected status somewhat.

## **Historic Context**

(The following paragraphs are summarized from the 11/15/91 letter report prepared by the North Central Information Service, California State University, Chico.)

The first Euro-Americans to enter the region appear to have been Hudson Bay Company and American Fur Company trappers seeking viable routes to the choice trapping grounds situated in the valleys below. Stephen H. Meek, a celebrated trapper, claims to have been the first white man to have gazed upon the Truckee River in 1833, while setting traps along the river. Jedediah Smith, led a party of trappers into the Tahoe region in 1825 and following this



in 1833, Joseph Walker also led a fur trapping brigade up to the Truckee River into California.

With the discovery of gold, much of western Sierra County became heavily populated as Euro-Americans and other ethnic groups flocked into the area. This phase lasted from 1848 to 1858. By the end of this period, gold became more difficult to procure without expensive investments in labor and equipment, bringing a change in the nature of gold mining and a change in livelihood for many of those who stayed in Sierra County. While some continued to mine many turned to ranching, farming, and mercantile endeavors.

With the depletion of easily mined placer deposits, mining efforts turned to hard rock and hydraulic mining, initiating a second phase in the history of Sierra County which lasted from 1859 to 1884. By the end of this phase, hydraulic mining had been largely prohibited and farming and commerce had become the State's most important economic pursuits.

The final phase began in 1884 and extends to present time. While mining was never entirely abandoned, it became a generally less important economic activity within the County; higher ore prices have resulted in a recent upswing in mining activity. After the formation of the National Forests in 1906, logging gained economic importance in the County's history.

## **Recorded Historic Sites**

310 historic sites and 56 prehistoric sites with historic components are recorded in Sierra County with the State Archaeological Inventory. Most of the historic sites are associated with mining activities, although there are many sites associated with logging, railroad logging, grazing, and homesteading. Again, numerous located sites have not been recorded with the Inventory (see discussion under "Recorded Prehistoric Sites").

Within the Tahoe National Forest, 900 historic sites have been inventoried (not all in Sierra County) to date. (Only 25% of the Forest has been inventoried as of 1990). Within the Tahoe National Forest, no historic sites are listed on the National Register of Historic Places — only prehistoric sites with historic components (Tahoe Forest Plan, 1990).

Within the Plumas National Forest, the Gibsonville town site remains and cemetery, the Johnsville-Gibsonville Road, the Port Wine town site remains and cemetery, the National Register listed Lakes Basin petroglyphs and



mining remains, and the Mills Peak lookout are of particular interest. The Plumas National Forest Plan includes standards for their protection.

Hennessey Pass Road (a portion of the Old Emigrant Trail) and Plum Valley House are registered State Historic Landmarks.

## **Historic Communities**

Most of Sierra County's existing communities have individually rich histories reflected in the structures, structural remnants, and street patterns which remain today.

- **Downieville** ~ Downieville, the County seat of Sierra County, was first named the Forks because of its location on the major tributaries to the North Fork of the Yuba River. Prospectors first reached the site of Downieville in the summer of 1849; William Downie arrived in November, 1849. By April 1850 it is estimated that five thousand people occupied Downieville. The town was completely burned down twice by fires first on February 19, 1852 and again on January 1, 1858, but was quickly rebuilt after each fire. On November 10, 1881, the citizens of Downieville applied for a patent to the townsite, which was granted. In 1896 electric power arrived. Pacific Telephone provided phone service between Downieville and Camptonville in 1913. State Highway 49 was completed in 1920. By 1964 most of the mines that historically provided Downieville's economic base had closed and lumber, recreation, and government employment had taken its place as the main employers.
- **Alleghany** ~ Alleghany became a town proper in 1853 spurred on by the area's gold mines. The town is named after the Alleghany tunnel which started producing in the spring of 1853. The period from 1870 through the 1890s was a time of nearly continuous mining activity for Alleghany. As an effect of World War II and the issuance of Law 208 of the War Production Board, most of the miners in Alleghany joined the armed services or worked in industries more directly related to the war effort. This caused closures of many mines in Alleghany until after the war when they resumed production. Until 1973 Alleghany did not have the status of a designated and surveyed townsite when the U.S. Forest Service transferred 145 acres of National Forest land to Sierra County for the creation of a townsite.
- **Calpine** ~ Calpine is a comparatively new town in Sierra County's history. The settlement began in 1919 and developed into a sizeable community as the result of the establishment of the Davies-Johnson



Lumber Company's sawmill, planing mill, and box factory. The town was first known as McAlpine, but post office authorities in Washington did not approve the name. The name Calpine was then selected. In 1939, the Davies-Johnson land and mill was purchased and converted into a retirement and recreational village.

- **Forest City** ~ Forest City diggings were first struck in the summer of 1852 and the settlement rapidly grew. By 1856 the population of Forest City began to decline due to the failure of mining around it, and the formidable rivalry of Alleghany. Forest City also suffered two fires which drove residents away, the first in April 1858 and the second in 1865. The decline of the 1860s came to an end in the early 1870s with discovery of Great Drift Placer Mines at Bald Mountain. In 1919 a flu epidemic infected 60 to 70 of the town's population of 160. Forest City survived the epidemic and the gold mines still continued to operate. In 1933, Forest City instituted a homecoming celebration held in late August of "Old Timers" who had made Forest City their home at one time or another. The celebration was a success and continued through the 1950s.
- **Goodyears Bar** takes its name from Miles Goodyear who was among the first settlers, arriving in the late summer of 1849. After gold was discovered the town grew quickly and a road that connects Downieville with Goodyear's Mountain House and Camptonville was completed in 1859. On September 5, 1864, a fire broke out that consumed the business portion of the town which was never fully rebuilt. A rejuvenation of sorts began in 1935 when a small sawmill opened. In 1940 the Brush Creek Mine began operations, and in 1960 the Sierra County Public Works operation moved to lower Goodyear's Creek.
- **Loyalton** ~ The town of Loyalton was originally known as Smith's Neck when it was first settled in 1854 by a group of miners called the Smith Company. The town was renamed Loyalton in 1863 because of the town loyalty to the Union cause during the Civil War. Unlike the rest of Sierra County in the early years, the Sierra Valley and Loyalton economies centered around ranching and lumber production. Incorporated in 1901 with 50.6 square miles in its limits, the large incorporated area was later reduced to its present size of 0.35 square miles. Loyalton had grown to a population of 983 by 1910. Between 1920 and 1960 most of the public amenities such as the water system, the Sierra Valley Hospital, and a combined elementary/high school were built.



- **Pike** was first known as Burke's Flat, after an Irishman from Pennsylvania. According to an entry in the August 2, 1883 *Sierra County Tribune*, its present name was received from "some frolicsome Pike" (*Alleghany and Forest City Treasure Towns*, James J. Sinnott). The economy of Pike in its early history was based in the area placer mines and the Alaska Quartz Mine, which opened in 1855. By 1887 the Alaska Company employed 120 men.
- **Sattley** ~ The town of Sattley was first named Church's Corners for the pioneer family of that name who settled there in 1860. When a post office was established in 1804, the name of the town was changed to Sattley. From 1860 through the early 1900s, a number of saw mills were located in the area as well as ranches which produced beef, dairy products, and grains.
- **Sierra City** was first discovered by prospectors in the spring of 1850. In the winter of 1853 a heavy snow storm crushed the emerging town and drove the entire population away. It was not until 1858 that a permanent town was rebuilt. Gold mining was the primary economic resource for the City through the 1900s. The City has since become the principle town as a center of recreation. Sardine Lake Resort opened in 1941 and Salmon Lake Resort began operations in 1950.
- **Sierraville** was established by two ranchers in 1854 and became a well-known farming community producing mainly beef, dairy and grain products. A horse racing track was established in 1868. On June 13, 1888 a fire nearly destroyed the entire business section of Sierraville. Sawmills and lumbering became major employers from 1880 through the 1900s. By 1905 area mills were producing over a million board feet of lumber a year. In 1918 a high school was established but burnt down in 1929. A new modern reinforced concrete school was built in the fall of 1930 which still stands today. The Sierraville Public Utility District was established in September of 1944 which provided a pressured water system for the town.

**Potential  
Site Sensitivity  
for Cultural  
Resources**

Since all of the County's cultural resources have not been (and may never be) located, it is important to recognize areas with potential sensitivity for cultural resources. To summarize, the following types of prehistoric and historic sites can be expected to occur throughout Sierra County:



**Table 12-2**  
**POTENTIAL SITE SENSITIVITY**  
**FOR CULTURAL RESOURCES**

- Prehistoric villages on ridgetops, along valley margins, and on elevated stream terraces by permanent water in the eastern and western zones.
  - Small prehistoric villages and campsites at resource collection zones throughout the County and, particularly, in the crest zone.
  - Prehistoric task sites such as bedrock mortars, quarries, lithic scatters, and petroglyphs located throughout the County in proximity to villages and campsites.
  - Mining sites in the western half of the County and portions of the crest zone which would be characterized by a wide variety of features including but not limited to mine shafts, tailings, townsites, cabin flats, wells, dumps and historic debris, and water conveyance remains such as ditches and flumes.
  - Roads and trails throughout the County associated with mining, logging, farming and commercial travel.
  - Grazing sites in the crest zone associated with ranching and farming in both the eastern and western areas.
  - Early ranching and farming sites in the eastern and western zones which would include stock holding sites and structures, cabin and house remains, foundations, wells and cisterns, and historic dumps.
  - Logging camps throughout the County associated with early forest service logging activities and railroad logging camps.
  - Historic structures within existing communities as well as abandoned habitation locations.
- 

**Important  
Cultural  
Resources  
Already  
Inventoried**

Any of these categories of cultural resource sites listed above could be considered significant resources worthy of protection. In addition, all cultural resources which have already been inventoried in the County are considered significant resources worthy of protection, including:

**Table 12-3**  
**IMPORTANT CULTURAL RESOURCES**  
**ALREADY INVENTORIED**

- Sites inventoried by the USFS within the Tahoe, Plumas, and Toiyabe National Forests (only a few of these are mapped on



the Confidential Cultural Resources Inventory within the Planning Department).

- Sites which have been recorded with the North Central Information Service. (These are located by Township and Range on the confidential Cultural Resources Inventory within the Planning Department.)
  - The historic areas of each of Sierra County's existing or "living" communities, (see Table 12-4) including individual pre-World War II structures or other newer structures of architectural interest or which contribute to the essential nature of the historic areas. The historic areas are shown on the Land Use Maps in the Land Use Element.
- 

**Table 12-4**  
**SIERRA COUNTY COMMUNITY**  
**LIVING HISTORIC AREAS**

Alleghany Community Living Historic Area  
Downieville Community Living Historic Area  
Bassetts Community Living Historic Area  
Calpine Community Living Historic Area  
Forest City Community Living Historic Area  
Goodyear's Bar Community Living Historic Area  
Loyalton Community Living Historic Area  
Pike Community Living Historic Area  
Poker Flat Community Living Historic Area  
Sattley Community Living Historic Area  
Sierra City Community Living Historic Area  
Sierraville Community Living Historic Area

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- Other individual historic structures noted on the confidential Cultural Resources Inventory within the Planning Department.
- Pre-1960 Sierra Valley barns and other pre-1960 barns and outbuildings throughout the County.
- Pre-World War II residences and structures throughout the County.
- Rural vista areas noted on the Visual Resources map in the Visual Resources Element, including those listed below in Table 12-5:



**Table 12-5**  
**SIERRA COUNTY RURAL VISTA AREAS**

Sierra Valley

Sites listed on any walking tour booklets and the Highway 49 driving tour booklet to be prepared by the Tahoe National Forest in the near future.

All County cemeteries

Agricultural and mining areas, structures or equipment which are determined to be historically important or which provide particularly valuable historic vistas.

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The readily mappable historic areas in Tables 12-4 and 12-5 have received an HP (Historic Preservation) Overlay designation on the Land Use Map.

**Rural  
Appearance /  
Protection of  
Historic Views**

Much of the County's rural appearance which is of value to the area's sense of community, quality of life, as well as the tourism based portion of our economy is made up of views of rugged, undeveloped lands as well as developed areas including Community Living Historic Areas (See Table 12-4). Rural vista areas which are currently in traditional uses such as ranching or mining or exhibit traces of past traditional uses such as ditches, flumes, trails, pre-existing communities, etc. are also important. Every effort should be made to preserve these areas and features directly as well as from impacts from surrounding land uses which could cause visual or land use conflicts.

**Protection of  
Historic /  
Prehistoric  
Resources**

The County has seen the loss of prehistoric or historic resources due to lack of maintenance (historic structures), lack of a full inventory of resources, vandalism, demolition, destruction during analysis, and lack of public awareness. While there is a great interest in the protection of cultural resources in the County, lack of protecting regulations, difficulty in adapting old structures to new uses (such as the Sierra Valley barns), and lack of funding have hindered preservation efforts. One particular problem in the past has been a difficulty in ensuring objective review of impacts to cultural resources when development projects have been proposed. The elements of a cultural resources review procedure were developed during the General Plan workshops and are included as implementation measures.



**Sierra Valley Barns** - The historic Sierra Valley barns are a particularly visible historic resource. Unfortunately, the old wooden buildings are outmoded and difficult and costly to maintain. However, their preservation is important to preserving the nature of the Sierra Valley; they are a non-renewable resource. The Planning Commission discussed numerous methods of encouraging their preservation including use of conservation tax easements (See Table 12-8):

- The requirement of demolition permits
- Careful allowance of adaptive reuse (see Agricultural Element for further discussion)
- County willingness to accept ownership or visual access easements of important barns to ensure their maintenance in the state of arrested decay, and
- The pursuit of grants to assist owners in their maintenance.

The recreational and tourism value of rustic barns and sight seeing within the Sierra Valley was also recognized.

**Compatibility with Economic Activity** - The need to provide for adaptive reuse of historic structures was recognized during the General Plan workshops. However, it was also recognized that great care needs to be taken in adaptive reuse to ensure that the historic value of structures is not lost. A use related to the traditional use is preferable, but if not possible attention to the original character of the structure and its surroundings is important. The U.S. Secretary of the Interior's General Standards for Historic Preservation Projects (see Table 12-7) offer excellent guidelines. Related specifically to the Sierra Valley barns and agricultural lands, only limited ancillary uses which are tied to production on the land are tied to production on the land are considered appropriate. (See Agricultural Element.)

In the future it is hoped that the County can help overcome these problems with:

- Effective regulations
- A de-politicized cultural impact review procedure
- The assistance of the Historical Society
- Creative funding mechanisms
- Coordination with other agencies and Tribal Councils
- Creative property owner assistance programs
- An attention to design detail in historic areas



**Table 12-6**  
**U.S. SECRETARY OF THE INTERIOR'S**  
**GENERAL STANDARDS FOR**  
**HISTORIC PRESERVATION PROJECTS**

The U.S. Secretary of the Interior General Standards for Historic Preservation Projects should be followed within Community Living Historic Areas and on individual historic structures throughout the County and should be provided to anyone renovating historic structures. The standards are practical and common sense in nature:

**SECRETARY OF THE INTERIOR'S**  
**GENERAL STANDARDS FOR PRESERVATION**

The following general standards apply to all treatments undertaken on historic properties listed in the National Register:

1. Every reasonable effort shall be made to provide a compatible use for a property that requires minimal alteration of the building structure, or site and its environment, or to use a property for its originally intended purpose.
2. The distinguishing original qualities or character of a building, structure, or site and its environment shall not be destroyed. The removal or alteration of any historic material or distinctive architectural features should be avoided when possible.
3. All buildings, structures, and sites shall be recognized as products of their own time. Alterations that have no historical basis and which seek to create an earlier appearance shall be discouraged.
4. Changes, which may have taken place in the course of time, are evidence of the history and development of a building, structure, or site and its environment. These changes may have acquired significance in their own right, and this significance shall be recognized and respected.
5. Distinctive stylistic features or examples of skilled craftsmanship, which characterize a building, structure, or site, shall be treated with sensitivity.
6. Deteriorated architectural features shall be repaired rather than replaced, wherever possible. In the event replacement is necessary, the new material should match the material being replaced in composition, design, color, texture, and other visual qualities. Repair or replacement of missing architectural features should be based on accurate duplications of features, substantiated by historical, physical, or pictorial evidence rather than on conjectural designs or the availability of different architectural elements from other buildings or structures.
7. The surface cleaning of structures shall be undertaken with the gentlest means possible. Sandblasting and other cleaning methods that will damage the historic building materials shall not be undertaken.
8. Every reasonable effort shall be made to protect and preserve archeological resources affected by, or adjacent to any acquisition, protection, stabilization, preservation, rehabilitation, restoration, or reconstruction project.



It is the policy of the County to encourage use of these standards. (See Policy 1, Implementation Measured)

**Table 12-7  
AVAILABLE TAX CREDITS**

Individuals should be aware of tax credits available for renovation costs. The County can assist in making residents aware of these programs which include:

- Federal tax credits for renovation of commercial structures on the National Register of Historic Places. **It is the policy of the County to work toward establishment of National Register Districts in the County;** (See Policy 4)
- State tax credits under the Mills Act allow for a reduction of the taxable value of structures similar to the Williamson Act contracts on agricultural land. **It is the policy of the County to encourage use of these tax credits;** (See Policy 11, Implementation Meas. a)
- Conservation easements can be taken which have the effect of a charitable contribution. A conservation easement requiring the preservation, special treatment, or use of a structure is placed on the deed to the property (similar to a sidewalk or access easement). The easement is donated to a non-profit group or the County and the value of the easement becomes the charitable contribution which can be deducted from State and Federal taxes. **It is the policy of the County to accept these easements.** (See Policy 10, Implementation Measure b)

**Table 12-8  
STATE HISTORIC BUILDING CODE**

The County can also assist in the technical aspects of renovation by making building owners aware of the State Historic Building Code. County building inspectors should also learn to utilize the Code. Use of the Historic Building Code is mandated by the State if an owner or developer requests its use in reviewing renovation plans. The Code allows for negotiating between the architect/builder and the building official on practices which meet basic life and safety requirements while preserving the integrity of the structure. For instance, many requirements of modern building codes do not "fit" older structures including:



- Railing height: Railings adhering to new requirements in many cases would be out of scale with historic structures.
- Seismic Safety: Most older structures cannot meet modern day requirements but through various methods can be made safe.
- Handicapped Access: Retrofitted handicapped access ramps can detract from the aesthetics of older buildings but alternative solutions such as wide back entries with elevators are often possible.

Generally, architects and builders familiar with historic renovation techniques should be used when utilizing the Historic Building Code.

**It is the policy of the County to actively promote use of the Historic Building Code and to disseminate it to all Design Review and Building Permit and other development permit applicants. (See Policy 1, Implementation Measure b)**







**PLANTS  
AND WILDLIFE  
ELEMENT**



**GENERAL PLAN  
2012**









JULY, 1996

## 13. Plants and Wildlife Element

### Background Report

#### Issues

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The issues listed in the first part of Table 13-1 below were raised at the public General Plan Issues Workshops or at other points during the General Plan process by consultants, staff or Planning Commissioners. While each of these issues may not have resulted in the development of a related policy (as a result of Planning Commission discussion) the list is included here as a record of the full range of concerns discussed.

Concerns regarding biological resources were also expressed at the General Plan Issues Workshops and Technical Scoping session. Other issues are derived from past planning documents and experiences and generally arose through the General Plan update process. Sierra Summit issues are also listed.

**Table 13-1**  
**SIERRA COUNTY GENERAL PLAN**  
**BIOTIC RESOURCES ISSUES**

#### General Plan Issues Workshops

##### Diversity of Species

The County has a great diversity of species: wolverines, eagles, etc. which are extremely valuable to the County for their economic value as well—Organized groups primarily from the Bay Area routinely visit the County to enjoy its biotic diversity. (Continued...)



**Special Plants**

Sierra County has the largest population of *Silene* in the world. There are concentrations at elevations of 6200-7000 feet in the Gold Lakes area.

Four sub-species of *Ivesia* are found in Sierra County.

**Wildlife**

The snow plant is a important biological resource.

Existing wildlife populations are unique and should be protected.

Though the deer population (not herd specific) is currently growing, kills due to lion is on an increase caused by pressure from black bears.

Increase in roadside lion kills in Downieville and Sierra City are a concern.

**Wildlife /Habitat Corridors**

Preserving and maintaining connecting habitat corridors is a concern of the County.

**Fish and Game Revenues**

There is a general decline in revenues for the Department of Fish and Game which has impacted the County.

**Note:** Department of Fish and Game Biologist Syd Kahre indicates that this statement is not correct.

**General Plan Update Process and Technical Scoping Session****Wetlands/Riparian Areas**

Wetlands and riparian areas are of local, regional, and nation-wide importance and have a history of depletion.

**Old Growth Forest**

The management of old growth forests is a regional and nationwide issue which is affecting both special species and timber harvests on public and private lands.



## **Habitat Management**

The California Department of Fish and Game and the U.S. Forest Service have some specific habitat management programs on public lands which are flanked by private lands.

## **Relationship to Other Uses**

Protection of biological resources may conflict with both urban and rural land uses including but not limited to:

- Urban development
- Timber harvest
- Mining
- Agriculture
- Hydroelectric power
- Recreation
- Hazardous Materials storage and disposal

The extent of the conflict depends on the nature of both use and the potentially-affected resource.

## **Sierra Summit**

Summary Statements prepared for the Sierra Summit, at Fallen Leaf Lake, California (November 17-18, 1991)

Summary Statements include a discussion of biological issues by Dr. David Parsons. Major impacts from the activities are described:

- Fire suppression
- Timber harvest
- Grazing
- Air pollution
- Drought/Pests
- Urban and residential sprawls
- Future global climate changes

Sensitive plant species and communities are also described with emphasis on wetlands and riparian areas. Finally, genetic and biological diversity are described as issues receiving too little attention in land management decisions. Other related statements are:



"Terrestrial Fauna in the Sierra Nevada: Present Status and Prospects for the Future," by David Graber, and

"Aquatic Biota/Water/Water/Water Quality," by E. F. Pister.

The paper on Sierra fauna notes that "... the factors that influence plant life in the Sierra are those that will have the most substantial effects on the largest number of animal species." Many of the same factors described by Parsons are noted here with the addition of pollution.

These papers are included in the Appendix.

### **Bioregional Strategy**

A "Memorandum of Understanding" (MOU) was developed as a result of the Sierra Summit. The MOU, also called "The Agreement on Biological Diversity" establishes an Executive Council authorized by the signatory parties to "... develop and adopt a coordinated regional strategy that ensures protection of biological diversity and the maintenance of economic viability throughout California." The signatory parties include five state agencies, four federal agencies, and the University of California. The general approach envisioned is to establish several bioregional councils which would implement regional biodiversity strategies and coordinate, companion efforts by local authorities. A comprehensive approach is sought as an improvement on the current practice in which individual agencies focus on protecting specific species at specific sites. The published material on this Bioregional Strategy is contained in the Appendix.



## Technical Scoping Session

<b>High Mountain Meadows</b>	Mountain meadows should be retained by limiting invasion of noncompatible species such as Lodgepole pine and Quaking aspen.
<b>Private Ponds</b>	Wetlands are lost through the draining of private ponds and diversion of streams.
<b>Biological Reporting</b>	Not everything sighted is reported to the Natural Diversity Data Base.
<b>Interagency Coordination</b>	Environmental documents sent to other agencies don't always reach the individuals with the most biological knowledge.
<b>Detailed Mapping</b>	Detailed biological mapping could be helpful; this should include wildlife movement corridors.
<b>Economic values</b>	Diversity of habitat is of economic value to tourism.
<b>USFS Old Forest/Riparian Net-work program.</b>	The principals resulting from the in-progress USFS old Forest/Riparian Network study should apply to private lands.
<b>Tropical bird migration routes</b>	Evolving information on tropical bird migration routes important.
<b>Special species</b>	Special emphasis is needed on wildlife management of specific species, such as the Peregrine falcon, deer, and migratory geese.
<b>Migrating deer</b>	Cross-country deer herd routes are of concern.
<b>Land acquisition</b>	Land acquisition by the USFS & DFG for wildlife management should be supported.



<b>Land exchanges</b>	County input needed on land exchanges. Cross-County exchanges may not be desirable.
<b>Fire protection/ wildlife/Urban interface</b>	There is a move to introduce fire back into the forest.
<b>Water Quality</b>	Water quality for fisheries protection and aquatic vertebrates a concern (many ore candidate species). Old growth/riparian corridors need to be wider based on actual vegetation -- it should be 100 foot outside riparian area or outside floodplain -- whichever is largest.
<b>Hydro-electric Plants</b>	Hydro-electric facilities can impact wildlife.
<b>Agriculture/grazing impacts</b>	Agriculture/grazing can conflict with wildlife concerns -- grazing can impact meadows.
<b>Off-Highway vehicles/ snowmobiles</b>	Off-highway vehicles and snowmobiles can impact wildlife. There is money available for 4-wheel drove projects -- perhaps money can be used for wildlife enhancement. We need to identify habitat they should stay out of.
<b>Timber Harvest Plan roads and mining roads</b>	Timber Harvest Plan roads and mining roads result in loss of habitat and water quality degradation. Gates and barricades don't work -- permanent closures needed. 4-wheel drive impacts result.

The General Plan Guidelines list the following as biology-related Mandatory



The General Plan Guidelines list the following as biology-related Mandatory Issues (pp. 117-118, 132):

Rivers and other waters

Fisheries

Wildlife

Open space for the preservation of natural resources including, but not limited to:

Areas required for the preservation of plant and animal life including habitat for fish and wildlife;

Areas required for ecologic and other scientific study;

Rivers, streams, bays and estuaries; and

Coastal beaches, lakeshores, banks of rivers and streams, and watersheds.

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## Background Discussion

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Sierra County's many habitats range from the semi-arid Great Basin Sagebrush to the saturated riparian corridors. These environments support fish, deer, bear and many other animals which are largely unseen. The County's plants are also diverse and include some that are found primarily in its rugged mountains. The County's biotic resources, through agriculture, timber, recreation, and watershed, are tied to the County's economy. Stampede Reservoir, Jackson Meadows Reservoir, the Lakes Basin area and Webber Lake support most of the camping and fishing use. Hunting occurs County-wide. Finally, Sierra County's various habitats help to preserve water quality within the County and downstream.

This Plants and Wildlife Element Background section begins with a discussion of each of the issues raised (where additional discussion is needed). This discussion of issues is then followed by a description of known areas of special biologic concern organized by watershed.

### General Vegetation

The "Calveg" system (Parker and Matyas, USFS Regional Ecology Group,



May 1980) provides a general overview of where broad vegetation types occur within the County (see Figure 13-1). This mapping is presented for the purpose of general orientation.

## **Species Diversity**

Species diversity, also known as biodiversity, underlies many of the recent wildlife controversies and is a major consideration in evolving habitat management strategies. The future direction of management on the Tahoe National Forest (TNF) is indicated in the following excerpt from "Recommendations for Managing Late-Seral-Stage: Forest and Riparian Habitats on the Tahoe National Forest" (Tahoe National Forest, February 1992, pp. iii, iv):

Biological diversity was not included within the original scope of this project. However, several appeals of the Forest Plan for the Tahoe National Forest focused on this issue and some recommendations for maintaining biological diversity are made here. Maintaining biological diversity should involve a program for rare species and communities. A program for managing the remaining species in forest matrices of large bioregions, such as the west-slope Sierra Nevada, is also suggested. Cooperative development of these programs among interested publics, private landowners, and the responsible state and federal agencies is recommended. Completing a biological survey, integrating survey results with the existing California Natural Diversity Database, and completing individual or group management plans are recommended for managing rare species and communities. A considerable amount of the remaining forest matrices should be managed to mimic natural patterns to conserve overall biological diversity. Patterns of natural forests are not completely understood for the Sierra Nevada and the existing landscape may be too disturbed to permit useful studies. However, managers can assume that natural patterns will serve overall biological diversity. Similar assumptions cannot be made with conventional management and additional research on natural landscape patterns is highly recommended.

The County's principal role in managing the bioregions described will be in reviewing and regulating land uses on private lands and in cooperating with State and federal agencies whenever possible. An important part of this process will be the continued utilization of the California Natural Diversity Data Base (NDDDB). The NDDDB incorporates two concepts which are critical to the management of biodiversity:

- The consideration of more species than just those which are formally listed as threatened or endangered (see description of "Special Species" in the subsequent section);
- The consideration of unique "natural communities" in addition to individual species.



# SIERRA COUNTY VEGETATION









These concepts are described in the sections which follow.

### **Special Plants and Animals**

As described above, the latter part of this Background section is a description of Areas of Special concern, organized by watershed. The term 'Areas of Special Concern' is derived from the use of the word "Special" by the Natural Diversity Data Base (NDDDB) in listing animals and plants of concern. The definition of special animals is given in the excerpt from the NDDDB list shown in Table 13-2.



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Table 13-2  
CALIFORNIA DEPARTMENT OF FISH AND GAME  
NATURAL DIVERSITY DATA BASE  
Special Animals – August 1991

"Special Animals" is a broad term used to refer to all the vertebrate and invertebrate taxa of concern to the Natural Diversity Data Base (NDDDB), regardless of their legal or protection status. Special Animals listed with a code fall into one or more of the following categories:

- Officially listed or proposed for listing under the State and/or Federal Endangered Species Acts.
- State or Federal candidate species for possible listing.
- California Department of Fish and Game Species of Special Concern.

*[Note: The NDDDB breaks these categories down into the following subcategories:]*

- Listed as Endangered
- Listed as Threatened by the State of California
- California Candidate for listing as Endangered
- California Candidate for listing as Threatened
- California Department of Fish and Game "Species of Special Concern"
- Listed as Endangered by the Federal Government
- Listed as Threatened by the Federal Government
- Proposed as Endangered by the Federal Government
- Proposed as Threatened by the Federal Government
- Federal (BLM and USFS) Sensitive Species
- Category 1 Candidate for Federal listing (Taxa for which the U.S. Fish and Wildlife Service has sufficient biological information to support a proposal to list as Endangered or Threatened)
- Category 2 Candidate for Federal listing (Taxa which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking)
- "Recommended" for Category 1 status by the U.S. Fish and Wildlife Service
- "Recommended" for Category 2 status by the U.S. Fish and Wildlife Service

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SOURCE: California Dept. of Fish and Game

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The corresponding NDDB definition for plants is shown below:

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**Table 13-3**  
**CALIFORNIA DEPARTMENT OF FISH AND GAME**  
**NATURAL HERITAGE DIVISION**  
**NATURAL DIVERSITY DATA BASE**

**Special Plants August 1991**

"Special Plants" is a broad term used to refer to all the plant taxa inventoried by the Natural Diversity Data Base, regardless of their legal or protection status. Special Plant taxa are species, subspecies or varieties that fall into one or more of the following categories:

- \* Officially listed by California or the Federal Government as Endangered, Threatened or Rare;
  - \* A candidate for state or federal listing as Endangered, Threatened or Rare;
- \* Taxa which meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the CEQA Guidelines;
- \* A Bureau of Land Management, U.S. Fish and Wildlife Service or U.S. Forest Service Sensitive Species;
- \* Taxa listed in the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California;
- \* Taxa that are biologically rare, very restricted in distribution or declining throughout their range but not currently threatened with extirpation;
- \* Population(s) in California that may be peripheral to the major portion of a taxon's range but are threatened with expiration in California;
- \* Taxa closely associated with a habitat that is declining in California at an alarming rate (e.g. wetlands, riparian, old growth forests, desert aquatic systems, native grasslands, valley shrubland habitats, vernal pools, etc.).

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SOURCE: California Dept. of Fish and Game

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The descriptions of Areas of Special Concern within Planning Watersheds discusses NDDB occurrences of special plants and animals.



Another habitat classification system developed by the State is for use in a computer program called the California Wildlife Habitat Relationships System (WHR) which predicts the occurrence of various animals based upon habitat characteristics.

The WHR system was used as part of the General Plan Update to obtain a list of animals predicted to occur within the entire County; the list is included in the General Plan Appendix. Of the 315 species listed, 47 are special animals as defined above; four of these are federally or state listed as Threatened or Endangered (bald eagle: U.S. and California Endangered; Swainson's hawk: California Threatened; Peregrine Falcon: U.S. and California Endangered; and wolverine: California Threatened). Species range mapping within the WHR publication, "California's Wildlife", Vol. I-III, was used to determine which of the 47 special animals might be predicted to occur within the Areas of Special Concern. The resulting lists within the discussion of each Area are preliminary since they are not based on field surveys of habitat characteristics and actual use of the WHR system.

It should be noted that the WHR system is potentially important to Sierra County because it can be used in the environmental review and project consideration processes. It would be theoretically possible to map WHR habitats throughout the County, but the cost of the extensive field work and accompanying analysis is prohibitive. A more likely scenario is for the County to require WHR-informed investigations as part of the environmental review procedure for individual development/project applications.

Unique and rare assemblages of plants and animals, called "Natural Communities", are also considered special as described in the following excerpt (NDDB letter dated November 7, 1991): "The data base also inventories both terrestrial and aquatic natural communities that are of extremely high quality or very limited distribution. These natural communities contain a rich heritage of native animals and plants that contribute significantly to the State's natural biotic diversity."

The Natural Community classification system was developed by Heatham and Haller (1975) and modified by Glen Holstein; Deborah Jensen and Robert Holland. While comprehensive mapping of the County under this system is not available, the following Special Natural Communities are predicted to occur within its boundaries (Robert Holland, Personal Communication, February, 1992).



**Table 13-4**  
**SPECIAL NATURAL COMMUNITIES**  
**PREDICTED TO OCCUR IN SIERRA COUNTY**

<u>Special Natural Community</u>	<u>Generalized Location / Setting</u>
Gabbroic Northern Mixed Chaparral	Possibly associated with ultra mafic rock areas in western Sierra County.
Mixed Serpentine Chaparral	Serpentine rock exposures, particularly in the area between Saddleback Mountain and Lafayette Ridge.
Leather Oak Chaparral	Serpentine rock exposures, particularly in the area between Saddleback Mountain and Lafayette Ridge.
Serpentine Bunchgrass	Serpentine rock exposures.
Great Basin Grassland	Any pre-European grasslands of Sierra Valley, Upper Long Valley, and Sardine Valley.
Vernal Pool	Sierra Valley and in openings of Jeffrey pine-Mountain Mahogany stands and elsewhere.
Wet Subalpine Meadow	Remotely possible at the very highest elevations, such as just north of Mt. Lola.
Dry Subalpine Meadow	Remotely possible at the very highest elevations, such as just north of Mt. Lola.
Montane Meadows	Widely scattered.
Alkali Meadow	Sierra Valley.
Alkali Seep	Sierra Valley.
Sphagnum Bog	Scattered through conifer zone, observed in Bald Mountains.
Darlingtonia Bog	Scattered through conifer zone, observed in Bald Mountains.
Fen	Scattered through conifer zone.
Transmontane Alkali Marsh	Sierra Valley.
Transmontane Fresh Marsh	Sierra Valley.
Montane Freshwater Marsh	Scattered through conifer zone.
White Alder Riparian Forest	Riparian zones throughout western Sierra County, such as the North Fork Yuba River and tributaries.
Aspen Riparian Forest	Bald Mountain Range and elsewhere.
Montane Black Cottonwood Riparian Forest	Streams feeding Sierra Valley.
Montane Riparian Scrub streams.	In Montane meadows and along forested streams.
Modoc-Great Basin Riparian Scrub	Along streams in sagebrush country.
Knobcone Pine Forest	West of Sierra Buttes, Cherokee Creek watershed, and possibly other areas.
Washoe Pine-Fir Forest	Between Babbitt Peak and Mount Ina Coolbrith.



As in the case of Special Plants and Animals, the burden of proof regarding the presence or absence of a Special Natural Community will be on the environmental review process.

## Old Growth Forests

In order to address old forest issues, the Tahoe National Forest initiated a study by Forest Service biologists, working with biologists from other agencies. This study led to the document: "Recommendations for Managing Late-Seral-Stage Forest and Riparian Habitats on the Tahoe National Forest." (TNF, February 1992). The following excerpt from their document explains the role of old growth forests as habitat for various types of wildlife (pp. 5-6):

### III. fish and wildlife habitat relationships in late-seral-stage forests

Overall, there are few studies of wildlife and fish habitat relationships in older forests of the Sierra Nevada. Therefore, habitat relationships information must be largely extrapolated from other regions.

A primary influence of older forests on fish habitat is the recruitment of large-woody debris (LWD) to stream environments. Large wood plays an important role in stream structure and function. For example, LWD provides an important source of nutrients for stream environments, shapes and stabilizes the channels, traps sediment, and creates structural complexity and rearing habitat for salmonids. The influence of the forest on stream environments changes as watercourses enlarge. Forests influence larger streams primarily on the edges, where they stabilize stream banks and create and maintain side channels and backwater areas, whereas forests tend to influence the entire stream channel of smaller watercourses.

Comparisons of wildlife from managed and unmanaged Douglas-fir forests in the Pacific Northwest indicate that very few vertebrates distinguish between managed late-seral-stage forests and unmanaged older forests. Rather, vertebrate species and communities associated with older forests seem to require the stand attributes that increase with age. Large overstory trees, cool and moist conditions on the forest floor, horizontal and vertical habitat diversity, and abundant large logs and snags consistently have been shown to be important habitat components for wildlife associated with older forests. The specific habitat elements that are important vary by species and taxonomic group.

Studies of amphibians and reptiles associated with managed forests have demonstrated similar trends in a variety of locations. Overall, amphibians are significantly more abundant in older forests and increase considerably as young stands mature. Amphibians in the Sierra Nevada fall into two broad groups: 1) amphibians, such as frogs, which are dependent on free-standing water for reproduction or other phases of their life cycle; and 2) completely terrestrial amphibians, such as many species of salamanders, which require moist areas but live their entire life cycle without free-standing water. Most studies have demonstrated or suggested that larger terrestrial amphibian populations are associated with site conditions that maintain cool, moist stand conditions and provide large, decomposing logs or large pieces of tree bark.

Reptiles are rare in moist, cool, older forests and are most abundant in the youngest stands and warmer, dryer old-forest ecotypes. Disturbed sites that maintain considerable vegetative structure have been shown to support larger reptile populations than sites that have little available structure. The available literature does not identify serious problems or concerns for maintaining reptile species associated with forested habitats at this time. However, habitat relationships information for reptiles in forests is very limited.

Habitat structure has been identified as the primary factor influencing bird communities in



managed and unmanaged forests. High densities of large trees, large snags, tree-height diversity, and the presence of a well-developed understory have been consistently correlated with the presence of many bird species in older forests. Higher bird species diversity in older forests is largely due to the increases in these characteristics as stands mature.

In general, there are no major differences in the number of small-mammal species between old and young forests. Most studies have indicated a change in community composition because some species prefer young-aged or recently cut stands and others prefer older stands. The structural characteristics of forests of various ages appear to be more important to mammals than stand age.

Habitat relationships information was reviewed for 16 species identified as having strong habitat associations with older forests (see Appendix C [of original report, note added]). None of the species reviewed appear to be dependent on all the predominant elements of late-seral-stage forests; each species is associated with specific components of older forests in a way that differs from the others. When considered collectively, the group of individual species is closely associated with all of the primary components of old-growth and late-seral-stage forests.

Objectives and recommendations for old forests along streams are shown in Table 13-5. These recommendations form part of the basis for the overall network recommendations discussed in a subsequent section. The Riparian/Old Forest Network section.

**Table 13-5**  
**OBJECTIVES FOR THE OLD-FOREST ZONE OF THE**  
**RIPARIAN/OLD-FOREST NETWORK**

<b>Objectives</b>	<b>Recommendations</b>
<b>Headwaters</b>	
Provide potential natural arrangements of large trees, logs, and snags for amphibians and small mammals.	Establish upland areas to protect all existing and potential sources of large dead wood. Upland areas should be at least as wide as the potential height of the tallest trees capable of growing on site. (Same as determined for the riparian zone.)
Provide forest floor microclimate that resembles natural conditions.	Provide for the potential natural community in the forest canopy and understory vegetation in the upland zone.
<b>Small Streams</b>	
Provide travelways for the full range of species associated with old-forest and riparian habitats. Assume free movement across the channel.	Establish old-forest zones that measure 300 to 1200 feet from edge to edge. The riparian zone (stream channel, floodplain, and upland areas) is included within the old forest zone.



## Large Streams

Provide year long and seasonal habitat for species associated with older forests. The stream channel may be a barrier to movement for many species inhabiting the adjacent forest in the lower reaches.

Establish old-forest zones that measure 1200-1650 feet. The 1650 foot zone guideline is recommended. Where the stream channel is not a barrier, the riparian zone channel, floodplain, and upland habitat should be included within the old-forest zone. Where the channel or floodplain are barriers to movement, establish old-forest zones on both sides of the floodplain, beginning at the interface of the 100 year floodplain and adjacent upland.

Provide travelways for the entire range of vertebrates associated with old-forest and riparian habitats.

The guidelines for yearlong habitat above will provide adequate conditions for free movement of vertebrates associated with old-forest and riparian habitats.

## Rivers

Provide yearlong and seasonal habitat for species associated with older forests. The stream channel is a barrier to movement of many species inhabiting the adjacent forest.

Establish old-forest zones that measure 1200 to 1650 feet wide on each side of the stream channel beginning at the edge of the 100-year floodplain. The 1650 foot zone guidelines is recommended.

Provide travelways for the entire range of vertebrates associated with old-forest and riparian habitats.

The guidelines for yearlong habitat under large streams will provide adequate conditions for free movement of vertebrates associated with older forests and riparian habitats.

SOURCE: Tahoe National Forest, "Recommendations for Managing Late-Seral-Stage Forest and Riparian Habitats on the Tahoe National Forest", Table 5, p. 22. February 1992

## Riparian Corridors

The TNF recommended Riparian/Old Forest Network described above is intended to serve two purposes: 1) it protects riparian vegetation, and 2) it protects valuable wildlife movement corridors.

The importance of riparian areas to wildlife is described in the following excerpt from the Riparian/Old Forest Network document (pp. 14-15):

### II. FISH AND WILDLIFE HABITAT RELATIONSHIPS IN RIPARIAN AREAS

Riparian areas are the three-dimensional interfaces of direct interaction between terrestrial and aquatic ecosystems. These interactions involve many factors and processes, including: microclimate (e.g., light, temperature, and humidity), in organic and organic matter exchange to streams and floodplains, and nutrient cycling, among others. Vegetation, hydrology, soil character, and topography all determine the type, magnitude, and direction of functional relationships, energy flow, and nutrient cycling in these zones. Riparian areas encompass stream source areas (e.g. springs), the active stream channel and side channels, floodplain, and portions of upland areas that directly affect the aquatic system. Riparian areas vary in width in



response to variation in floodplain width, extent of riparian vegetation, and upland conditions and processes.

The physical structure of a stream, coupled with its hydraulics, form a template for biological responses and results in consistent patterns of community structure and function, and organic matter loading, transport, utilization, and storage along the length of a river. The biological community structure and function changes in response to the geomorphic, physical, and biotic variables, such as stream flow, channel morphology, detritus loading, size of particulate organic matter, characteristics of autotrophic production, thermal responses, and changes a stream order. The biological community shift from upstream to downstream is largely due to the influence of the riparian vegetation on the amount of sunlight reaching the stream, organic inputs, and water temperature.

The characteristics that are consistently correlated with high quality habitat for fish and other aquatic biota, such as insects, within stream environments include the following: 1) the potential natural composition and arrangement of riparian and adjacent upland forest canopy and understory vegetation; 2) uninterrupted surface and subsurface water flows; 3) natural (presettlement) stream temperature; 4) potential natural arrangement and recruitment of large-woody debris; 5) natural (presettlement) sediment conditions; and 6) watershed connectivity to allow upstream and downstream migration of aquatic species.

The primary components of high quality riparian habitats outside the stream include: 1) large-woody debris (both standing and down); 2) subsurface hydrologic processes; 3) soil and slope stability; and 4) the potential natural arrangement and composition of riparian vegetation. In addition, upland areas of the riparian zone function as high quality, late-seral-stage forest habitat for many wildlife species. Key habitat elements in these areas include: 1) large overstory trees; 2) large logs; 3) large snags; and 4) multi-layered vegetation. In many cases, these adjacent uplands are extremely important in insulating and stabilizing riparian microclimates and sediment loading and in providing large-woody debris.

Riparian systems provide habitat for many of California's amphibian and reptile species. Amphibians tend to inhabit small stream, headwater, seep, spring, and meadow habitats in forested regions, whereas reptiles increase in warmer, dryer habitats. Most studies have demonstrated or suggested that larger amphibian populations are associated with macrosites conditions that maintain cool, moist stand conditions and microsites that offer large decomposing logs or large pieces of tree bark. Reptiles generally avoid the moist, cool microclimates usually associated with small streams, headwaters, etc., becoming more abundant in the more open, dryer conditions afforded by larger watercourses or smaller watercourses of drier ecotypes.

Riparian areas are a critical link for the maintenance of overall avian species diversity and abundance because they provide high quality habitat and increase the avian habitat suitability of surrounding areas. Riparian zones are important to breeding birds, migrating species, birds of prey, and endangered species. Studies of bird community diversity, richness, and overall abundance demonstrate disproportionate use of riparian areas over adjacent habitat types. This condition has been attributed to several factors including: 1) the presence of diverse and highly productive vegetation; 2) the positive edge effects of streams; 3) the high availability of terrestrial and aquatic insects; 4) the productivity of surrounding area; and 5) the presence of water.

Approximately 25 percent of the mammals found in California are limited to or largely dependent upon riparian or wetland habitats. Key riparian habitat elements for mammals include: 1) riparian vegetation; 2) large overstory trees, snags, and logs; and 3) stand diversity. Characteristics of riparian habitats that also may be important to mammal species include: availability of water, greater availability of forage (fruits, herbs, deciduous shrubs, mast) than in upland habitats,



higher populations of invertebrates, more stable temperatures, linear continuity of habitat, coarser and more friable soils, the presence of multiple seral stages in adjacent uplands, and abundant aquatic and terrestrial carrion. Factors found to be positively correlated with the presence of some small-mammal species include plant species richness, decayed logs or number of logs, number of brush piles, number of stumps, slope, percent shrub and forb cover, evergreen herbs, and deciduous herbs.

Overall, there are few strong empirical relationships between attributes of stream environments or riparian habitats and wildlife use or population trends. Habitat relationships information was reviewed for 23 species identified as having strong habitat associations with riparian areas (see Appendix C [of original report, note added]). None of the species reviewed appear to be dependent on all the predominant elements of riparian habitats; each species is associated with specific components in a way that differs from the others. When considered collectively, the group of individual species is closely associated with all of the primary components of riparian ecosystems.

The Riparian/Old Forest Network objectives and recommendations for riparian zones are described in Table 13-6. These objectives and recommendations are part of the underpinning for the proposed network described in the following section.

**Table 13-6**  
**OBJECTIVES FOR DESIRED FUTURE CONDITIONS**  
**IN RIPARIAN ZONES**

<b>Objectives</b>	<b>Recommendations</b>
<b>Headwaters</b>	
Provide natural (presettlement**) stream temperatures through time.	Provide natural composition and arrangement of adjacent forest canopy and understory vegetation (herbs, shrubs, and small trees).
Provide the potential natural arrangement of large-woody debris in all time periods.	Establish upland areas to protect all existing and natural and potential sources of large dead wood. Upland areas should be at least as wide as the potential maximum height of the tallest tree capable of growing on the site.
Provide the potential natural sources of organic and inorganic material to the stream environment through time.	Provide the potential natural composition and arrangements of riparian vegetation and adjacent forest canopy and understory vegetation.
Provide natural (presettlement**) sediment loads in stream channels over time.	Provide adequate ground cover and vegetation in the upland areas as sediment buffers. Rehabilitate disturbed sites. Eliminate ground-disturbing activities in the zones.
Provide undisturbed surface and subsurface water flow processes over time.	Prevent ground-disturbing activities in the riparian zones. Maintain stability in sensitive upslope areas.
Provide watershed connectivity for movement of aquatic organisms in all time periods.	Provide adequate flows and fish passage structures. Regulate activities that drain or reduce stream flows to provide adequate watershed connectivity.



Provide potential natural composition and arrangements of riparian trees and shrubs for wildlife through time.	Use best professional judgement to establish estimates of potential natural communities. Restore native tree and shrub assemblages, where they have been degraded or eliminated. Maintain natural conditions where they exist.
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Protect riparian and associated upslope microclimatic conditions through time.	Determine zone widths needed over and above all other recommendations to provide adequate buffering of sensitive microclimate conditions.
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\*\* Management should attempt to provide conditions which existed during presettlement periods where possible. Where not possible, management should provide conditions that are as close to presettlement conditions as possible.

SOURCE: Tahoe National Forest, "Recommendations for Managing Late-Seral-Stage Forest and Riparian Habitats on the Tahoe National Forest", Table 2, p. 16. February 1992

## The Riparian/ Old Forest Network

Based upon old forest and riparian habitat characteristics, the TNF document then recommends a program consisting of the following components:

- An overall landscape design
- Desired conditions for riparian habitats
- desired characteristics for old-forest habitats
- Adaptive management elements
- Suggestions for implementation

The recommended landscape design is described in the following excerpt from the document (pp. i-ii):

The proposed landscape design consists of some large blocks of mature forest and a Riparian/Old-Forest Network. The goal for the large blocks is to conserve viable populations of wildlife that are associated with the interior conditions of old-forest habitats. The Wildlife and Fishing Working Group assumed that the arrangement for large blocks will be determined through adoption of a new conservation strategy for the California spotted owl. The resulting distribution and arrangement of blocks, in conjunction with the Network proposed here, should then be tested for its adequacies in providing habitat for other interior species, such as fisher and marten. The large blocks should be managed to provide the same habitat attributes as are being recommended for the old-forest zone of the network (large trees, snags, and downed logs and a multi-storied canopy).

A Riparian/Old-Forest Network is the second component of the recommended landscape design. The network provides a continuously connected system of late-seral-stage forest that is centered on watercourses. The network has three components: 1) the riparian zone; 2) the old-forest zone; and 3) connectors.

The riparian zone consists of the stream channel, floodplain, and upland areas that influence the stream environment. The recommended objectives for the riparian zone are: 1) to provide a high quality stream environment; and 2) maintain key structural and microclimatic elements in streamside areas that are important for aquatic organisms and wildlife. The elements that are consistently shown to be correlated with high quality stream and terrestrial riparian habitats are: 1) stream temperature; 2) arrangement and recruitment of large woody debris (LWD); 3) sources



of organic and inorganic material to the stream; 4) sediment conditions; 4) subsurface water processes; 5) watershed connectivity; 6) composition and arrangement of riparian trees and shrubs; and 7) riparian and upslope microclimate.

The width of the riparian zone should be determined locally to meet and perpetuate these long-term elements. In most cases, the minimum width of the zone would be the potential maximum height of the tallest tree capable of growing on the site, to provide for LWD input into the stream and floodplain (a minimum of approximately 125-200 feet on each side of the channel). However, wider zones may be necessary to provide for the other elements.

The old-forest zone of the Riparian/Old-Forest Network increases with stream size. In headwater areas, the old-forest zone generally occupies the same area as the riparian zone; however, the width may be increased to provide for desired microclimatic conditions. In small streams, the old-forest zone is intended to provide travelways for wildlife that measure 150-600 feet on each side of the channel, including the riparian zone. In large streams, the older forests are expected to provide yearlong or seasonal habitat in addition to travelways. In these areas, the old-forest zone measures 600-825 feet on each side of the channel, including the riparian zone, when the channel and floodplain are not a barrier to movement for the associated species. The old-forest zone should be placed on both sides of large streams where the channel and floodplain are judged to be barriers to cross-channel animal movement, and should measure 1200-1650 feet on each side of the channel. Along rivers, the old-forest zone is also intended to provide yearlong or seasonal habitats and travelways for associated wildlife. The zone measures 1200-1650 feet on each side of the channel.

Connectors are included in the Riparian/Old-Forest Network to link late-seral-stage habitats into a completely connected system. The connectors are intended to provide travelways for wildlife and measure 300-1200 feet in width, depending upon the associated furbearer species found there (fisher and marten) and the quality of habitat. Connectors should be arranged so that old-forest habitat in all planning watersheds are linked with that in each adjacent watershed. Linking headwater areas of adjacent watersheds is recommended where feasible.

This landscape design is depicted in Figure 13-2.

The desired characteristics of old growth forests are described below (p. iii):

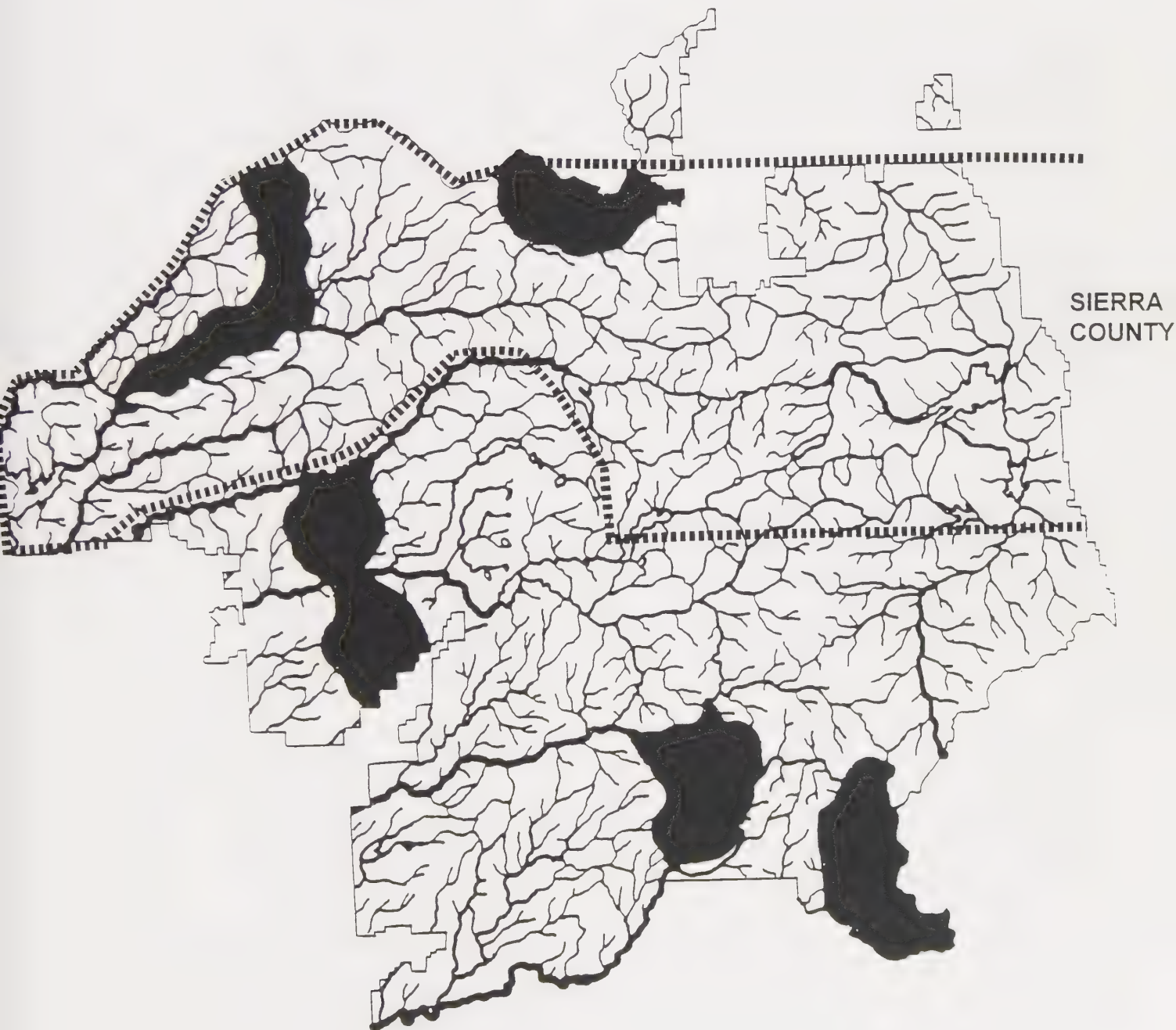
Focusing on the potential-natural composition and arrangement of the key habitat elements important for terrestrial vertebrates in old -forests (large trees, snags, and down logs, and multi-layered canopies) is recommended for the large blocks, old-forest zone, and connectors. Determining the arrangements that represent natural conditions is not always possible, but the potential-natural vegetation can be determined on a site-by-site basis. The desired-future condition of these elements, depending on site potential, can be approximated by using the data collected by the Region 5 ecologists during the development of old-growth definitions for the major forest types in the Sierra Nevada.

Management recommendations include:

1. Program evaluation, using geographic information systems, wildlife simulation models, and other computer systems
2. Monitoring
3. Research



FIGURE 13-2  
A CONCEPTUAL LAYOUT OF THE OLD-FOREST/RIPARIAN SYSTEM  
ON THE TAHOE NATIONAL FOREST





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Implementation recommendations include:

1. Maintaining project options
2. Assessing long-term and short-term effects, and
3. Watershed planning

Related to Watershed Planning, the report "strongly recommends" that the TNF ranger districts change from use of the traditional timber compartments for planning purposes to subwatersheds of roughly 2,000 to 10,000 acres. This Wildlife Element provides an information system which is roughly similar to the suggested system described above though with watersheds substantially larger than 2,000 to 10,000 acres.

One potential problem for the TNF in implementing the Riparian/Old Forest Network, is the patchwork pattern of public and private lands in Sierra County and other counties; this pattern is potentially contradictory to the basic idea of a network. Some connectivity will be provided by the partial retention of riparian zone vegetation along streams mandated by the California Forest Practices Act (see Timber Element), but the maintenance of natural habitat conditions in wider older forest corridors is unlikely to occur.

## **Sierra County Streams**

Sierra County streams are regarded scenic wildlife and recreation corridors. According to County ordinance, all trout streams are accessible to the public for the purpose of angling. Larger, more heavily used streams are generally considered important, but even streams of minor importance, in terms of providing angling, may be vital in terms of trout spawning or rearing habitat and maintenance of water quality and invertebrate habitat.

Sierra County waters support 25 species of fish. Historically, all lakes except Independence Lake and most small streams were devoid of fish. Today, trout have been introduced to most lakes; chalkone salmon, Arctic graylings, brown trout, lake trout, eastern brook trout, and golden trout compete with the native rainbow trout, Lahontan cutthroat trout and mountain white fish (California Department of Fish and Game, Sierra County Wildlife Conservation Element, 1977). The existing fishery is primarily cold water fishing, but the reservoir at Bullard's Bar contains warm water fish: large mouth and small mouth bass, crappie and catfish. The major harvest species are rainbow trout, brown trout and eastern brook trout. Most lakes and streams are planted annually with a variety of harvest species. All water-influenced areas in the County are important biologically, regardless of their size and configuration; the lakes and streams in Tables 13-7 and 13-8 are the most readily mappable and thus are mapped as Areas of Special Concern (Figures 13-3 to 13-15). Specific



information on stream characteristics is contained in the 1977 Wildlife Conservation Element and is incorporated by reference into this document (pages 3-124).

Sierra County watercourses were classified in 1971 under the provisions of the "California Protected Waterways Act of 1968". The classifications were defined as follows (pp.122-123)::

Class I	Premium Waterways State interest and importance usually involved; attract visitors from throughout the State. Evaluation based on the ten criteria ranks these waterways well above all others.
Class II	Very Good Waterways. Regional interest and importance usually involved; attract visitors from a less than statewide area, normally within about a 200-mile radius. These waterways have high values when judged by the ten criteria, but they rank just below those in Class I.
Class III	Important Waterways. County-wide interest and importance usually involved; used primarily by residents of the county. Criteria evaluation ranks these just below those in Class II.

The following Sierra County waterways and lakes were classified as shown below (pp. 123-124):

Class I	Premium Scenic, fishery, wildlife and recreational waterway North Yuba River (above Highway 49)
Class II	Very Good Waterway Sagehen Creek Middle Yuba River
Class III	Important Waterway Little Truckee River Canyon Creek
Class I	Premium Trout Lakes and Reservoirs Webber Lake Lakes Basin including Gold Lake Stampede Reservoir
Class II	Very Good Trout Lakes and Reservoirs Independence Lake Jackson Meadows Reservoir
Class III	Very Good Wildlife Waterway (riparian) Sierra Valley channels Potential scientific reserve waterway Independence Lake

These water features are discussed as Areas of Special Concern in a subsequent section.



**Table 13-7**  
**LOCATION OF LAKES IN SIERRA COUNTY**

<b>Name</b>	<b>Location (coordinates)</b>
Calpine Reservoir	T21N R14E S20
Coburn Lake	T20N R14E S29
Deadman Lake	T20N R13E S7
Deer Lake	T21N R12E S30,31
Deer Lake, Little	T21N R11E S24
Delahunty Lake	T22N R10E S20
Dugan Pond	T20N R12E S8
Gold Lake	T21N R12E S17-20
Little Gold Lake	T21N R12E S19
Goose Lake	T21N R12E S21
Grass Lake	T21N R12E S32
Haven Lake	T21N R12E S21
Hawley Lake	T21N R11E S14
Horse Lake	T21N R12E S29
Independence Lake	T19N R15E S33-35
Jackson Meadows Reservoir	T19N R13E S18-20,29,32
Lake of the Woods	T19N R14E S15,20
Lombardi Pond	T21N R16E S18
Lost Lake	T21N R12E S32
Milton Reservoir	T19N R12E S12
Mud Lake	T20N R12E S5
Oakland Pond	T21N R11E S13
Packer Lake	T20N R12E S5
Papoose Lake	T21N R12E S21
Poverty Hill - Dredger Ponds	T20N R9E S6
Salmon Lake, Lower	T21N R12E S28
Salmon Lake, Middle	T21N R12E S29
Salmon Lake, Upper	T21N R12E S29
Sand Pond	T20N R12E S10
Sardine Lake, Lower	T20N R12E S9,10
Sardine Lake, Upper	T20N R12E S9,16
Saxonia Lake	T20N R12E S9
Smith Lake	T21N R11E S27
Snag Lake	T21N R12E S21
Snake Lake	T21N R11E S13
Spencer Lake, Lower	T21N R11E S10
Spencer Lake, Upper	T21N R11E S10
Squaw Lake	T21N R12E S20
Stampede Reservoir	T19N R17E S19
Summit Lake	T21N R12E S19
Tamarack Lake, Lower	T20N R12E S8
Tamarack Lake, Upper	T20N R12E S8
Volcano Lake	T20N R12E S9,10
Webber Lake	T19N R12E S28
Young America Lake	T20N R12E S17

SOURCE: California Department of Fish and Game, Sierra County Wildlife Conservation Element, 1977.



**Table 13-8**  
**LOCATION OF STREAMS IN SIERRA COUNTY**

Name	Location	Name	Location
Alder Creek	T20N R16E S22	West Branch Downie River	T21N R10E S35
Antelope Creek	T21N R15E S21	Empire Creek	T20N R11E S18
Badenaugh Creek	T21N R16E S34	Eureka Creek	T20N R10E S19
Balls Creek	T21N R17E S24	Evans Canyon	T21N R17E S3
Barry Creek	T21N R13E S9	Fiddle Creek	T19N R9E S17
Bear Creek		Little Fiddle Creek	T19N R9E S3
(trib. Middle Fork Yuba)	T19N R11E S28	Fletcher Creek	(Sierra Valley)
Beartrap Meadow	T21N R13E S33	Frazier Creek	T21N R12E S4
Bear Valley Creek	T20N R16E S20	Gale Creek	T19N R9E S34
Berry Creek	T20N R13E S24	Gibson Creek	T22N R10E S30
Big Avalanche Ravine	T20N R12E S32	Gold Point Ravine	T20N R11E S28
Big Canyon	T20N R13E S1	Goodyear's Creek	T19N R10E S5
Black Jack Ravine	T19N R11E S15	Grant Ravine	
Blatchley Canyon	T19N R14E S12	(trib. to Indican Cr.)	T19N R9E S20
Bonta Creek	T19N R14E S3	Great Eastern Ravine	T20N R12E S25
Bow Creek	T19N R9E S2	Grizzly Creek, Big	T21N R10E S10
Brush Creek	T19N R10E S31	Grizzly Creek, Little	T21N R10E S10
Butcher Ranch Creek	T20N R11E S3	Grouse Creek	T18N R9E S11
Campbell Gulch	T18N R8E S2	Hackmans Ravine	T20N R12E S33
Canyon Creek	T19N R8E S11	Hamlin Creek	T20N R14E S26
East Fork Canyon Creek	T21N R10E S12	Haskell Creek	T21N R13E S31
West Branch Canyon Ck.	T21N R10E S2	Haypress Creek	T20N R13E S30
South Fork Canyon Creek	T21N R10E S12	Hog Canyon	T20N R11E S16
North Fork Canyon Creek	T21N R10E S1	Hoke Creek	T19N R17E S16
Little Canyon Creek	T20N R9E S10	Howard Creek	T20N R12E S2
Carman Creek	T21N R14E S6	Humbug Creek	T19N R9E S15
Carney Creek	T19N R11E S8	Little Humbug Creek	T19N R9E S15
Carvin Creek	T20N R12E S1	Hungry Mouth Canyon	T20N R10E S35
Chapman Creek	T21N R13E S32	Independence Creek	T19N R15E S13
Charalotte Creek	T19N R14E S32	Indian Creek	
Charcoal Creek	T20N R11E S35	(trib. to North Fork Yuba)	T19N R9E S19
Cherokee Creek	T19N R9E S6	(trib. to Middle Fk Yuba)	T18N R9E S16
Church Creek	T21N R12E	Jim Crow Creek	T19N R11E S6
S14,28		Johnson Creek	T19N R14E S31
Cold Stream		Kanaka Creek	T18N R9E S14
(Upper Section)	T20N R15E S33	Keystone Ravine	T20N R12E S30
(Lower Section)	T19N R15E S29	Kimberley Creek	T18N R10E S8
Cottonwood Creek	T20N R15E S34	Ladies Canyon	T20N R11E S27
Dark Canyon		Little Ladies Canyon	T20N R11E S27
(trib. to Lemon Cyn.)	T20N R15E S15		
(trib. to Hamlin Cr.)	T20N R14E S28		
(trib. to Evans Cr.)	T21N R17E S19		
Daves Ravine	T20N R10E S2		
Davies Ravine	T19N R16E S11		
Dead Horse Canyon	T20N R13E S32		
Deadwood Creek	T21N R10E S16		
Deer Creek	T20N R12E S11		
Devils Canyon	T19N R9E S12		
Dodge Canyon	T21N R16E S34		
Dog Creek	T19N R17E S7		
Dorsey Creek	T20N R13E S10		
Downie River	T20N R10E S26		



Lavezzola Creek	T20N R10E S23	Rock Creek	
Lemon Canyon	T20N R15E S15	(trib. to Smithneck Cr.)	T20NR17ES17
Lincoln Creek	T20N R13E S9	(trib. to North Fk Yuba)	T19NR10ES5
Little Truckee River		(trib. to Canyon Cr.)	T20NR9ES4
(above Stampede Res.)	T19N R14E S28	Sagehen Creek	T19NR16ES34
(below Stampede Res.)	T19N R17E S28	Salmon Creek	T21N R12E S28
Long Valley Creek		Sandusky Creek	T19N R10E S21
(trib. to Haypress Cr.)	T20N R13E S33	San Juan Creek	T19N R11E S18
Long Valley Creek	T21N R17E S1	Sardine Creek	T20N R12E S10
Lucky Dog Creek	T19N R10E S29	Sawmill Creek	T21N R12E S32
Lunch Creek	T20N R13E S10	St. Catherine Creek	T19N R9E S11
Marion Creek	T19N R9E S32	Secret Canyon	T19N R10E S12
Merrill Creek	T19N R17E S9	Slate Creek	T22N R9E S36
Miller Creek	T19N R9E S36	Slate Castle Creek	T20N R10E S36
Milton Creek	T20N R12E S36	Slug Canyon	T19N R10E S11
Mobile Ravine	T20N R11E S32	Smith Creek	T21N R11E S27
Negro Canyon	T19N R11E S2	Smithneck Creek	T20N R16E S25
New York Ravine	T20N R11E S31	Snow Creek	T20N R10E S18
Old Mill Creek	T20N R10E S6	Spencer Creek	T21N R11E S9
Onion Creek	T19N R15E S9	Squirrel Creek	T18N R9E S12
Oregon Creek	T19N R9E S23	Sulphur Creek	T21N R13E S5
Packer Creek	T20N R12E S3	Sunnyside Creek	T21N R11E S8
Pass Creek	T19N R13E S20	Trosi Creek	T20N R16E S27
Pauley Creek	T20N R10E S26	Turner Creek	T20N R13E S11
Perazzo Creek	T19N R14E S27	Whiskey Creek	T22N R10E S16
Pig Canyon	T20N R11E S16	Williams Creek	T20N R12E S13
Pipe Creek	T20N R9E S12	Wolf Creek	T18N R10E S12
Po Creek	T22N R10E S32	Little Wolf Creek	T19N R11E S31
Purdy Creek	T20N R17E S3		
Ramshorn Creek	T20N R10E S31		
Rattlesnake Creek	T21N R10E S24	Woodruff Creek	T19N R10E
Red Oak Canyon	T21N R11E S18	S8	
Rice Canyon	T19N R14E S24	Worn Mill Canyon	T19N R17E S26
		Middle Fork Yuba River	
		North Fork Yuba River	

SOURCE: California Department of Fish and Game, Sierra County Wildlife Conservation Element, 1977.

## Water Quality

Water quality is a critical concern to the maintenance of aquatic habitat in the County. Detailed discussion of water quality is located in Chapter 8. Water Resources Element.

## Stream Setbacks

A variety of recommendations exist on the distance land uses should be located from streams and other water courses. The California Department of Fish and Game normally recommends that structures be set back 50 feet from intermittent streams and 100 feet from perennial streams in developed or developing areas. The Tahoe National Forest establishes Stream



Management Zones of variable widths based on stream types and channel and side-slope stability — widths varying from 100-300 feet for perennial streams and 50-200 feet for intermittent streams (TNF Land and Resource Management Plan Appendices, page F-4). Timber harvest, grazing, road construction, and other activities are regulated in this zone.

Because of the steep slopes, the past degradation, and generally sensitive nature of Sierra County's streams, a setback larger than the minimum Fish and Game 100/50 foot setback is appropriate. This will generally be feasible outside of Community Core areas where little development and large lots are envisioned. However, within most Community Core areas, particularly in the Western County, the historic pattern of development is focused on the less steep slopes which tend to occur close to rivers and streams. These areas are served by roads and public facilities, and are currently disturbed by urbanization. For these and other reasons, this General Plan maintains the past development focus on the existing community areas. To accomplish this stream setbacks for buildings will have to be relaxed. Special Best Management Practices will be needed to minimize disturbance and erosion in these areas.

## **Regulated Wetlands**

Wetlands are defined by the U.S. Army Corps of Engineers and others areas having the following characteristics:

- Hydric (water-influenced) soils
- Hydrophytic (growing in water, or wet soil) vegetation
- Presence of water or moisture, perennially or seasonally

Some agencies, such as the U.S. Fish and Wildlife Service and the California Department of Fish and Game define wetlands as areas having any one of the above characteristics rather than all three.

Wetlands are regulated at the federal and State levels. At the federal level, both the Army Corps of Engineers and the Fish and Wildlife service are responsible for implementing federal legislation, most notably the Endangered Species Act and the Federal Clean Water Act. A key issue with both agencies is wetland protection. The Fish and Wildlife Service has a wetland policy calling for the protection of native wetlands. The policy beings with the following sentence: "Wetlands provide important fish and wildlife benefit as well as other significant functions (flood control, water quality maintenance, water supply recreation, scientific research) to the nation."



At the State level, the Department of Fish and Game is responsible for implementing the California Fish and Game Code and the California Native Plant Protection Act and has a policy on wetlands. The first statement in that policy reads: "I. California's remaining wetlands provide significant and essential habitat for a wide variety of important resident and migratory fish and wildlife species." The Department's regulatory role is generally confined to the Streamed Alteration Agreement process, unless threatened or endangered species are present.

Most of the wetlands in Sierra County are associated with the watercourses described in other sections of this Element. However, some wetlands, called isolated wetlands, occur away from water courses. These wetlands generally rely on high groundwater or springs for water. Prominent examples in Sierra County are the wet meadows that generally occur in mountain valleys. These wetlands have been mapped by the Fish and Wildlife Service based on satellite photography. These maps are on file at the Planning Department. The most prominent isolated wetlands are shown on the biology maps (Figures 13-3 to 13-15).

One issue raised at the General Plan Update Technical Scoping Session on biology was that some mountain meadows are being taken over by aspens and other vegetation with the potential to change the character of the meadows; the removal of this vegetation was suggested. This activity is not within the County's jurisdiction or funding ability, and may not be entirely desirable from a habitat management perspective. The USFS does implement projects to maintain mountain meadows. However, aspen invasion meadows is not necessarily viewed as a problem by the Tahoe National Forest, since aspen in meadows is a benefit to wildlife (comments made by Jean M. Masquelier, TNF District Ranger, letter dated November 15, 1993).

A second issue raised at the Scoping Session is the loss of wetlands associated with private ponds. Again, this issue is generally not within the County's jurisdiction unless linked to a proposed project requiring a permit. However, the County can fill an advisory role.

**Deer Use Areas** Of the two deer herds that reside in Sierra County, the Loyalton Truckee herd has been more intensely studied. Their population was artificially boosted in the 1940's to 36,000 deer by predator control, logging and wild range conversion increasing mid-successional species. The decline of the population in subsequent years was related to many factors, primarily habitat degradation. In the spring of 1991, a population of 7,900 animals



was estimated, and the percentage of fawns lost each year was high—65-75% (Syd Kahre, Personal Communication, 9/91). The winter range for the Loyalton Truckee herd is generally satisfactory. Much of the winter range is in Nevada, where its condition improved following a decrease in cattle grazing. The winter range in Sierra County varies in condition. In Long Valley, much of it is in poor to fair condition because of heavy livestock use and recent wildfires. Also, heavy grazing on some private lands in Sierra Valley have made the conditions poor for deer. Alfalfa provides a significant forage. The U.S. Forest Service and the Department of Fish and Game lands are in better condition. A coordinated Resource Management Plan for Antelope Valley defines deer as an important resource and calls for habitat improvements. Summer range is generally in fair condition. But the large brushfields produced by the Donner fire have matured leaving a lower quality forage. Also, although logging usually improves the summer range, the most recent activities have been Red Fir forests which do not tend to produce as much early successional deer forage as mixed conifer forests (Syd Kahre, Personal Communication, 9/91). Developments in other counties that the deer use also affect the population.

Much less is known about the Downieville herd. In 1991, their population was about 2,500 to 3,500 individuals. There is not data about the condition of their winter range, but it probably has declined in the last decade due to maturation and residential developments in Yuba County. Some areas have probably improved due to timber harvest in mixed conifer forest and wildfires (Syd Kahre, Personal Communication, 9/91).

The following areas are critical to the viability of deer herds within the County (Tables 13-9 and 13-10); they are listed according to the predominant type use each area experiences by deer (migration corridors, critical range, and holding areas).

- Major Migration Corridors The following areas are depicted on Department of Fish and Game (DFG) maps as Major Migration Corridors:



**Table 13-9**  
**MAJOR DEER USE AREA MIGRATION CORRIDORS**

Antelope Valley	Kyburz Flat
Bald Ridge	Lemon Canyon
Big Boulder Mine	Pike (Ridge area-/Wild Rose)
Butcher Ranch	Port Wine Ridge
Craycroft Ridge	Sierraville to Loyalton (foothill
areas)	
Dark Canyon	Stampede Valley
Dodge Canyon	Turner Canyon
Dog Valley	Upper Long Valley
Evans Canyon	West Slope of Bald Mountain
Range	
Great Eastern Ravine	

Note: Names assigned based on topographical features.

SOURCE: California Department of Fish and Game, Deer Herd Maps

- Critical Summer / Winter Range and Deer Holding Areas The areas listed below are mapped by the Department of Fish and Game as Critical Summer/Winter Ranges and Deer Holding Areas:

**Table 13-10**  
**CRITICAL SUMMER / WINTER DEER RANGES/FAWNING AREAS**  
**AND DEER HOLDING AREAS**

**Deer Range Areas**

Summer	Winter
Antelope Valley	Balls Canyon
Bear Valley	Dodge Canyon
Lemon Canyon	Evans Canyon
Perazzo Meadows	Our House
Turner Canyon	Staverville
Sagehen	Upper Long Valley
Sierraville-Loyalton	Verdi
	Sierra Valley



### Deer Holding Areas

Evans Canyon  
Sierra Brooks

Kyburz Flat  
Upper Long Valley

### Fawning Areas

Haypress Creek  
Little Truckee River/  
Sagehen Creek  
Merril Valley  
Rice Canyon

Northeast of Kyberz Flat  
Perazzo Canyon/  
Perazzo Meadows  
Purdy Creek

Note: Names assigned based on topographical features.

SOURCE: California Department of Fish and Game,  
Deer Herd Maps and wildlife maps prepared by Syd  
Kahre of DFG

### Deer Highway Mortality

Because the major, high speed roads in the County are State highways, the County has little direct control over how roadside deer mortality is managed. The primary means of lowering mortality are to lower travel speeds and to make motorists more aware of the hazard. Posting lower speed limits is thought to have little control over travel speeds, and their establishment is normally set based on the observed travel speeds of a set percentage of motorists. Speeds are inherently limited by the nature of roads. Posting of deer hazard signs may have some effect on making a percentage of motorists more cautious, and residents have suggested posting more signs in the past. There is a possibility that deer are drawn to roadways by the deicing salt that is applied. While this is not proven, it may be prudent to utilize sand rather than salt.

### Migratory Birds

The United States has treaties with Canada and Mexico enacted for the purpose of protecting migratory birds; both treaties generally ban the shooting of non-game migratory birds and the treaty with Mexico additionally established refuges. The U.S. Migratory Bird Treaty Act makes it a misdemeanor to violate any provision of either treaty (Environmental Law Institute, 1974, pp. 587-588).

There have been reports of declining numbers of many species of migratory songbirds in the Sierra Nevada; examples include warblers, flycatchers, vireos and other summer residents. Factors suspected in the declines include loss of tropical forests, loss of nesting habitat in the Sierra, nest



parasitism, and probably pesticides (Graber, 1991).

### **Tree Loss in Developing Areas**

Tree loss is a major issue in urbanizing areas and development has been named as a factor in the loss of oak woodlands and other plant communities. Tree loss in developed areas typically raises the connected issues of aesthetics, urban-adapted wildlife habitat, and others. Many communities have adopted guidelines or ordinances as a means of moderating the adverse effects of tree removal. Restocking and reforestation is strongly supported.

### **Escaped Exotic Plants**

An additional issue introduced by urbanization is that of escaped exotic plants, including but not limited to cheat grass and sweat pea. Some non-native plants are so aggressive in colonization they crowd-out native species. One example in neighboring Nevada County is Scotch broom, which has become widespread in some areas and has contributed substantially to fire fuel loading.

### **Generalized Impacts of Land Uses**

Virtually every land use has been implicated in the ongoing degradation of habitat. The 1977 Wildlife Element(pp. 337-399) describes the types of effects the following uses can have on various habitat factors :

- Recreation activities
- Homesites
- Mobile home parks
- Recreation developments
- Roads and streets
- Canals and flumes
- Gravel operations
- Logging
- Grazing
- Mining

This description is still valid and is incorporated by reference. The impacts of timber harvest are also discussed in the Timber Element and the Water Resources Element.

One of the effects of concern to participants of the technical scoping session is the extent of roads used for timber harvest and mining practices, and the ongoing effects of these roads in terms of human presence and erosion. The problem is that road closures are not entirely effective, and off-road vehicle use retards efforts to revegetate the roads. Extra attention to



the closure and reclamation of roads is a possible solution to these problems.

**Wildlife and  
Habitat  
Management**

As State and federal budgets become increasingly difficult to balance, there is the concern and possibility that funds available for wildlife and habitat protection and enhancement will be diminished. During the General Plan Update Technical Scoping session, Forest Service personnel indicated that decreasing revenues from timber sales may translate to decreasing funds for habitat enhancement programs. The County has no control over State and federal budgets, but it can require mitigation for projects over which it has jurisdiction such as subdivisions and mining.

Another habitat management issue mentioned by State and federal personnel is the presence of private land next to public lands where habitat management programs are in effect. One example is deer habitat protection and enhancement on the three State Wildlife Areas in the County; activities on adjacent lands could create barriers to deer migration, deplete deer browse, impact water supplies, or have other effects.

**Areas of  
Special Concern  
Within Watershed  
Units**

This section establishes Watershed Planning Units as a means of organizing information on biological features. Within each watershed, certain Areas of Special Concern are highlighted because they are known to contain special biological resources or habitats sensitive to development.

An attempt has been made in delineating areas of Special Concern to include locations where there is a probable high occurrence of special plants, animals, and natural communities. Because these Areas are not based upon field work or any detailed habitat mapping, they should be considered preliminary and subject to change as additional information becomes available. Also, a related major caveat to the mapping of the Areas is that they should not be interpreted to mean that other parts of the County are low in habitat value or special species. The California Wildlife Habitat Relationships Program, a computer model which predicts animal ranges based on habitat types, would predict at least some special animals in all but the urbanized parts of the County.

In addition to the special plants and animals discussed above are the various "harvest" species, most notably deer and fish. The delineation of the Areas of Special Concern has also utilized available information on these species to include areas such as:



- Mappable lakes and water courses
- Deer migration corridors
- Critical deer wintering grounds
- Deer holding areas
- Known fawning areas

The Areas of Special Concern have been delineated based on the following sources:

- Sierra County Wildlife Element, 1977
- California Department of Fish and Game (DFG)
- Wildlife Maps by Syd Kahre
- Department of Fish and Game Deer Herd Maps
- Forest Service Management Plans
- U.S. Fish and Wildlife Service Wetlands Maps
- Various other documents listed under "References" at the end of this section.

## Sierra Valley Watershed

The Sierra Valley Watershed is the largest single watershed in the County, and one which has a large assemblage of special plants and animals. Special Areas of Concern in the Watershed are described below.

Sierra Valley. Sierra Valley is a 373,400 acre valley at an average elevation of 5,000 feet. In ancient times, the Valley was a lake comparable in size to Lake Tahoe. It is in the rain shadow of the Sierra Nevada Mountains and receives 15-20 inches of average annual precipitation, mostly in the form of snow. The temperatures fluctuate dramatically: 100° Fahrenheit in the summer to -20° to -30° Fahrenheit in winter. The winds are variable and depend on local topographic features. While much of the land is public, most of the lands of the Valley floor are privately held.

The waters of Sierra Valley eventually form the headwaters of the Middle Fork Feather River which is a federally designated Wild and Scenic River. Sierra Valley streams include:

**Table 13-11**  
**SIERRA VALLEY WATERSHED STREAMS**

Antelope Creek	Hamlin Creek
Bear Valley Creek	Lemon Canyon Creek
Berry Creek	Perry Creek
Bonta Creek	Sierraville Creek
Cold Stream Creek	Smithneck Creek
Cottonwood Creek	Turner Canyon Creek
Fletcher Creek	

SOURCE: USGS Quad Sheets.



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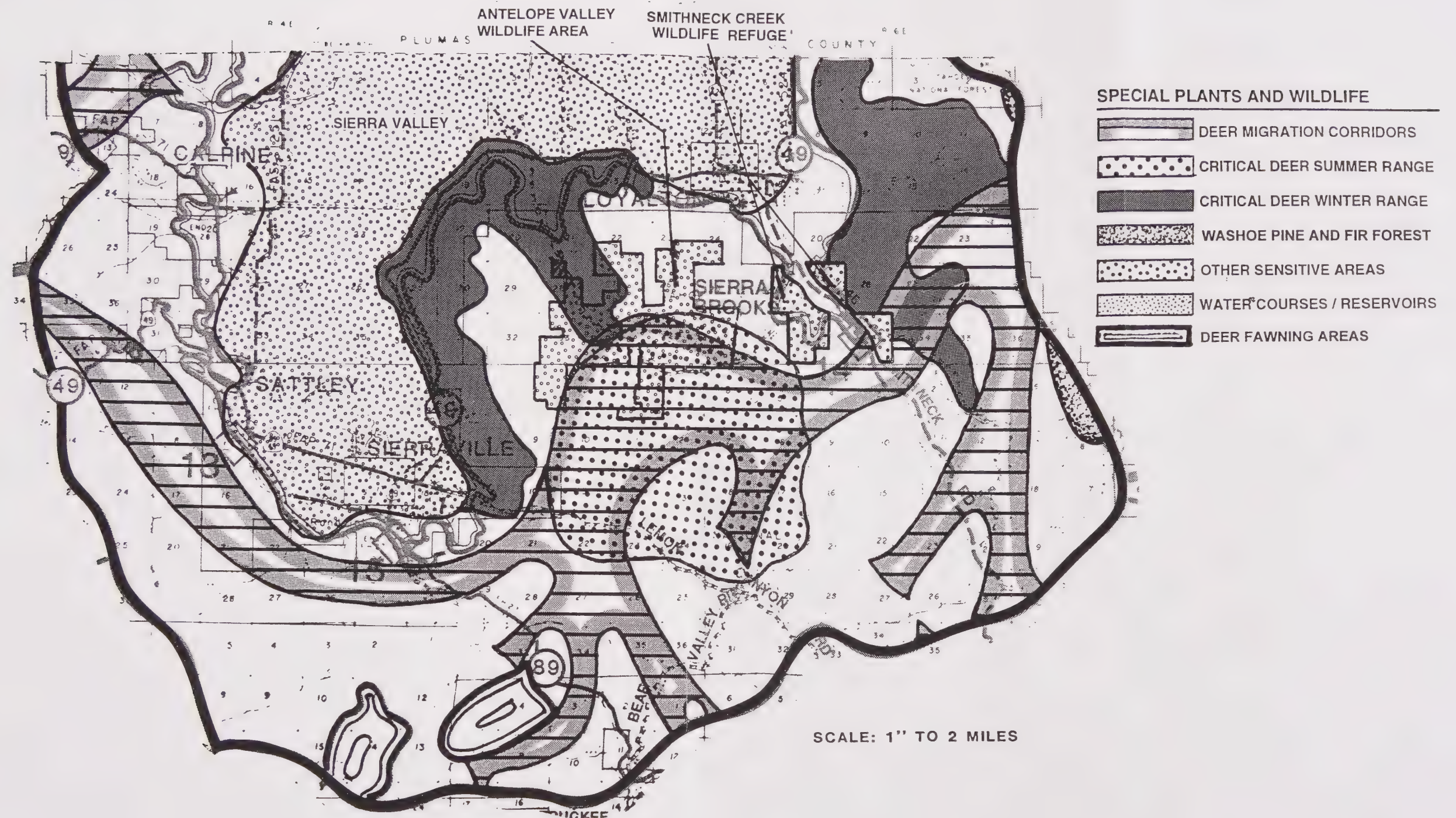


Figure 13-3

SIERRA VALLEY WATERSHED







The most heavily fished Sierra Valley stream, Cold Stream Creek, is developed with two campgrounds, a resort and adjacent highway. It carries water from the Little Truckee River to Sierra Valley. An unlined canal, this diversion was poorly designed and has erosion problems (DFG, Sierra County Wildlife Conservation Element, 1977). Even so, Cold Stream Creek supports a self-sustaining rainbow trout population. Another major stream, Smithneck Creek runs through the Sierra Brooks Subdivision; it mainly supports brown trout, but rainbow trout are planted near campgrounds.

Sierra Valley is an agriculturally oriented area promoting beef production with pasture and hay crops. CALVEG habitat types include urban, agriculture, Jeffrey pine, basin sagebrush and montane mixed shrub. Wildlife habitat relationship system habitats include pasture, Sierra mixed conifer-Jeffrey pine, sagebrush and montane chaparral.

An initial application of the California Wildlife Habitat Relationship (WHR) System background information suggests that the following special species may occur in and around Sierra Valley:



**Table 13-12**  
**SPECIAL WILDLIFE SPECIES**  
**PREDICTED TO OCCUR IN THE SIERRA VALLEY WATERSHED**

American white pelican	Vagrant shrew
Double-crested commorant	Little brown myotis
Osprey	Townsend's big eared bat
Northern harrier	Sharped-shinned hawk
Cooper's hawk	Pallid bat
Goshawk	Snowshoe hare
Ferruginous hawk	White-tailed hare
Golden eagle	Mountain beaver
Merlin	Northern flying squirrel
Burrowing owl	Western harvest mouse
Long-eared owl	Deer mouse
Purple martin	Badger
Yellow Warbler	Western spotted skunk
Savannah sparrow	Fisher
Song sparrow	Mountain lion
Bald eagle	Swainson's hawk
Peregrine falcon	Prairie falcon
Blue grouse	Sandhill Crane
Ringtail	Wolverine

SOURCE: DFG, California Wildlife Habitat Relations System, California's Wildlife, Vols. I-III

The following Special Species have been sighted in and around Sierra Valley:

**Table 13-13**  
**SPECIAL SPECIES**  
**SIGHTED IN THE SIERRA VALLEY WATERSHED**

Goshawk	Prairie falcon
Sierra Valley evening primrose	Webber's ivesia
Sierra Valley ivesia	Plumas ivesia

Note: Department of Fish and Game Biologist Syd Kahre indicates that Peregrine Falcon Bald Eagle and Sandhill Crane have also been sighted.

SOURCE: Natural Diversity Data Base, November 1991

One of the most frequent Natural Diversity Data Base (NDDDB) sitings in the Valley is Plumas Ivesia (Ivesia Sericoleuea). This rose family member is not formally listed, but is considered rare, vulnerable, and eligible for State



listing by the California Native Plant Society (CNPS, September, 1988, p. 5). It is found in Placer, Nevada, Sierra, and Plumas Counties where it occurs on alkaline flats and meadows between 4600 to 6600 feet. It is a Forest Service sensitive plant addressed by the TNF Sensitive Plant Program Standards and Guidelines (USFS, Tahoe National Forest, November 1992). Another plant recorded in the Valley is Sierra Valley Evening Primrose (*Camissonia tanacetifolia* ssp. *quadriperforata*). This plant is a federal candidate species for which data are insufficient to support federal listing; it is on the California Native Plant Society Watch List (CNPS, September 1988, p. 22). It is found on the east side of the Sierra in valleys between 4300 and 5100 feet, most commonly on mostly open clay flats. It is found in Sierra, Lassen, and Plumas Counties (USFS, Tahoe National Forest, November 1992).

Valley Uplands. Features of note in the uplands surrounding the Sierra Valley floor include deer migration routes and critical deer summer and winter range. For the purposes of this Element the migration routes present have been assigned the following names based on the nearest prominent landforms:

Sierra Valley Slopes  
Carman Creek  
Turner Canyon  
Dodge Canyon

NDDB recordings of Great Gray Owls, Goshawk, Prairie Falcon, Plumas Ivesia, and Sierra Valley Ivesia are located in the Valley uplands.

The Great Gray owl, the longest of any North American owl, is State listed as endangered. The current statewide population estimate is approximately 60 individuals, with only 10 different breeding pairs documented. The general habitat for the owl is Upper Montane Conifer forest (California Department of Fish and Game, 1991, pp. 42-43).

The Northern Goshawk is a California Species of Special Concern and a U.S. Forest Service Sensitive species. The Goshawk prefers middle and higher elevations and mature, dense conifer forest. It remains yearlong in breeding areas a scarce to uncommon resident (California Department of Fish and Game, November, 1990, pp. 130-13).

The Prairie Falcon is a California Species of Special Concern. It is associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas (California Department of



Fish and Game, November 1990, pp. 150-151).

The Sierra Valley Ivesia (*Ivesia aperta* var *aperta*) has the same status as the Plumas Ivesia (not listed but considered eligible by the CNPS) considered a sensitive plant by the TNF. It is thought to be threatened by residential development, agriculture, and grazing (CNPS, September, 1988, p. 66). Its habitat is alkaline flats and meadows between 4600 and 6800 feet in Sierra and Plumas Counties. It is addressed in the TNF Sensitive Plant Program Standards and Guidelines (USFS, Tahoe National Forest, November 1992).

Smithneck Creek Wildlife Area. Smithneck Creek Wildlife Area is located in the Southeast corner of Sierra Valley two miles south of Loyalton. The 1385 acre area was acquired by the State Department of Fish and Game in June 1988 and is designated a "Wildlife Management Area" by the Fish and Game Commission. Nonconsumptive uses such as hiking, bird watching, photography are allowed; grazing is prohibited, although a cattle trail runs through the area. Hunting and fishing are consumptive uses which are allowed.

California Wildlife Habitat Relationship Systems habitats include riparian, wet meadow habitat, mixed sagebrush and bitterbrush, and some eastside pine habitat. The mixed sagebrush and bitterbrush habitats make up good deer winter forage and raptors commonly winter in the area.

The management objective is to maintain and enhance the value of the area and adjacent property as winter range and migration corridor for the deer that winter in Ball's and Evan's Canyons and Peterson Mountains. In addition, habitat will be preserved and improved for other wildlife species. Concerns to the fisheries include eutrophication from septic tank effects, siltation from subdivisions and the possible future realignment of Smithneck Road to improve access to Stampede Reservoir. Sierra Brooks residents' concerns are important in deciding management policies (Department of Fish and Game, "Smithneck Creek Wildlife Area Draft Management Plan", 1990). Adjacent areas should be managed with the reserve in mind. For more information, refer to the Smithneck Creek Wildlife Area Plan.

Antelope Valley Wildlife Area. The Antelope Valley Wildlife Area comprises 4485 acres located between Sierraville and Loyalton. The Area was purchased by the State Department of Fish and Game in 1980 to preserve critical deer winter range and migration routes from developments for homesites.



The habitat of the Area is much like the nearby Smithneck Creek Wildlife Area, primarily mixed sagebrush and bitterbrush, punctuated by riparian and eastside pine habitats.

Various management concerns within the Area and adjacent lands have been raised in the past, leading to the "Antelope Valley Coordinated Resource Plan" prepared in 1985. This Plan had the participation of the Department of Fish and Game, the U.S. Forest Service, the U.S. Bureau of Land Management and various private landowners, mostly ranchers; the Plan addressed approximately 21,000 acres. The principal concern noted was the conflict between grazing and wildlife management, although various other issues were reported and reflected in the following Plan Goals:

#### IV. Management Goals

Goals common to the resource management agencies and private landowners within the Antelope Valley Coordinated Resource Plan Area are:

- A. Maximize and improve deer habitat.
- B. Achieve deer herd size and composition as specified in the Loyalton-Truckee deer herd plan.
- C. Coordinate grazing with private landowners to complement wildlife habitat improvement.
- D. Manage timber resource to improve range and wildlife habitat and to reduce fire hazard, and improve the health of the stand.
- E. Provide technical assistance and expertise to private landowners.
- F. Develop and implement a public access plan which protects the resources of the area.
- G. Improve and rehabilitate riparian areas in Antelope Valley for watershed protection and wildlife habitat diversity.

#### **Herlong Watershed**

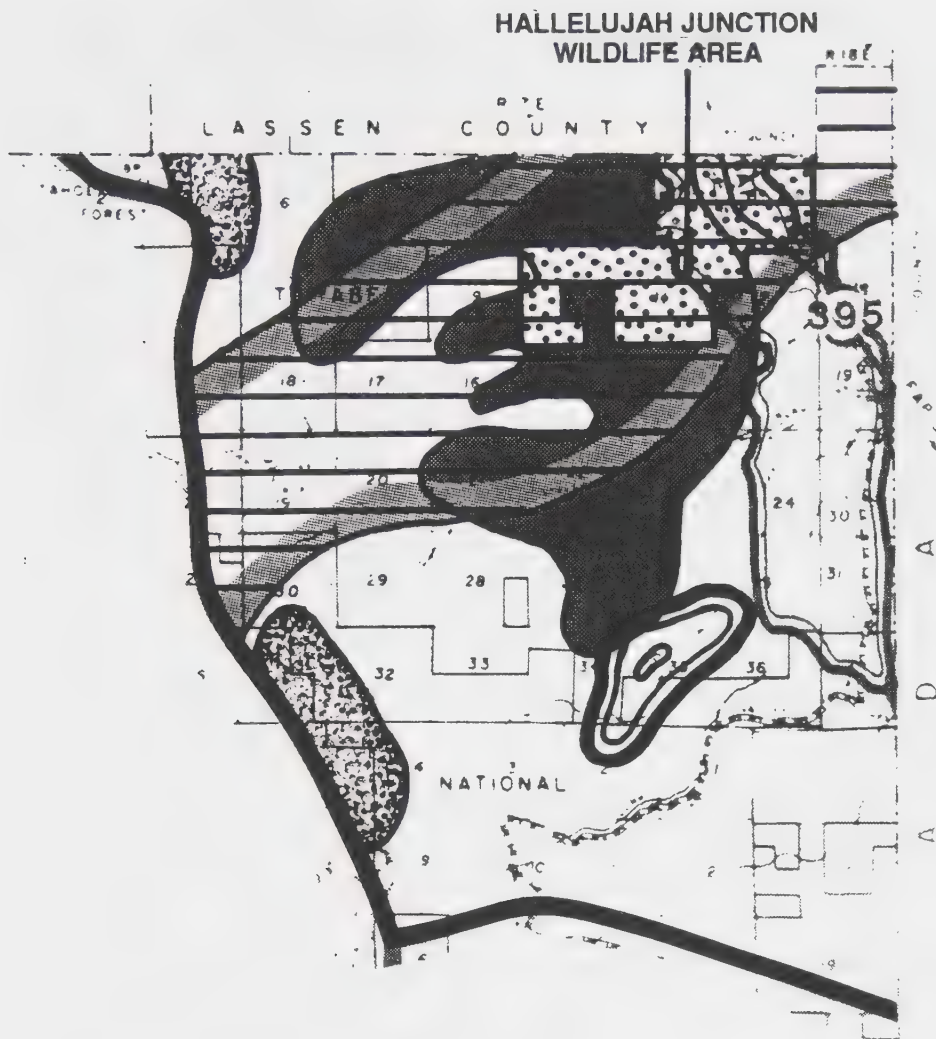
The Herlong Watershed includes the Dark Canyon/Evans Canyon deer migration corridor, the Evans Canyon/Balls Canyon critical deer winter range, Washoe pine fir Forest, and the Hallelujah Junction Wildlife area.



The latter two features are discussed in more detail below.





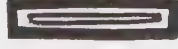
Washoe Pine and Fir Forest. This natural community is one of those considered by the Department of Fish and Game to have the highest inventory priority due to rarity. While not formally considered rare, the Washoe pine is on the California Native Plant Society Watch list and is very localized in its distribution, occurring in the Warner Range in Modoc County, in a few locations along the east side of the Cascades, and in the Sierra at Mount Rose and the two Sierra County locations: Bald Mountain and Mount Ina Coolbrith. The plant appears to be most closely related to a subspecies of ponderosa pine which occurs in the Rocky Mountains. Washoe pine occurs with white fir in Sierra County (Bob Holland, Personal Communication, 4/6/93).





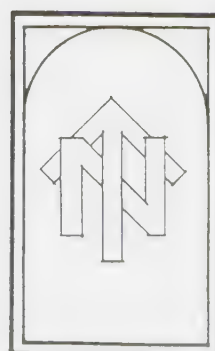
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#### SPECIAL PLANTS AND WILDLIFE

-  DEER MIGRATION CORRIDOR
-  CRITICAL DEER WINTER RANGE
-  WASHOE PINE AND FIR FOREST
-  OTHER SENSITIVE AREAS
-  DEER FAWNING AREAS

**Figure 13-4**  
**LONG VALLEY / HERLONG**  
**WATERSHED**

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Hallelujah Junction Wildlife Area Hallelujah Junction Wildlife Area is located astride the Sierra Lassen County line about one mile west of the California/Nevada state line and is roughly bisected by Highway 395. The 6150-acre area was acquired by the State in 1989 and is designated a "Wildlife Management Area" by the Fish and Game Commission. Its elevation is 5,200 feet. When Highway 395 was expanded into a four-lane freeway in the 1970's, three deer crossings were constructed as mitigation measures against highway mortality. Easements include railroad and highway; telephone power poles and wires; drainage facility; landscaping highway maintenance and access to Evan's Ranch and Associates and Evan's Ranch Inc. Evan's Ranch Inc. also holds an easement to conduct drilling tests to determine the availability of water and for the construction, maintenance and operation of water wells and utility poles (DFG, 1990. Draft Management Plan). The Department of Fish and Game may use the water from Long Valley Creek to maintain the wildlife corridor, but what is left goes to Evan's Ranch Inc. The adjacent properties are open space and undeveloped lands. 2720 acres of this area are within Sierra County.

Long Valley Creek drains the property northward to Honey Lake, near Susanville.

All but the highest portions of the property are great basin scrub habitat including sagebrush, bitter brush, annual and perennial grasses. The highest areas contain mountain mahogany.

The Loyalton Truckee deer herd use the area extensively from early winter to mid spring, but use it little in the summer. Long Valley is also an important raptor wintering area.

The management objective is to preserve key deer winter range and an important interstate deer migration corridor from development. Habitat will be improved through vegetation manipulation and management to increase its value to deer and other wildlife (Department of Fish and Game, "Hallelujah Junction Wildlife Area Draft Management Plan", 1990). Adjacent properties should be managed with the reserve in mind. For more information, refer to the Hallelujah Junction Wildlife Area Plan.



## **Dog Valley Watershed**

The principal areas of concern in the Dog Valley Watershed are deer migration corridors, the Verdi critical deer winter range, populations of Sierra Valley Ivesia (see description under Sierra Valley), and populations of Webber's Ivesia and Dog Valley Ivesia.

Webber's Ivesia (*Ivesia webberi*) is rare in Nevada and in California is only known to the Sierra Valley and Dog Valley areas. It is considered by the California Native Plant Society to be endangered in part of its range (CNPS, September 1988, p. 66). This Ivesia's habitat is dry barren ground in open patches of volcanic ash in sagebrush scrub, 5000 to 6000 feet. It has been found on State, federal and private land within the Forest boundary. The plant is a Forest Service Sensitive Plant recommended for total protection by the Tahoe Forest. The Plumas, Tahoe, and Toiyabe Forests completed a cost-sharing agreement with the Nature Conservancy to search for this plant in 1991. Ivesia is addressed as part of the TNF Sensitive Plant Program Standards and Guidelines, described under "Related Plans" (USFS, Tahoe National Forest, November, 1992).

According to a California Native Plant Status Report, two of the four known California occurrences of Webber's ivesia have been eliminated due to competition from non-native plants, urbanization, and grazing (California Department of Fish and Game (DFG) Natural Diversity Data Base, in conjunction with the California Native Plant Society and the DFG Endangered Plant Program. Revised. September, 1990). According to the status report, the two remaining populations are in an area where some grazing occurs but the most serious threat to the Dog Valley population is the possible inundation of the Valley for a reservoir – housing development, farm expansion, and increased grazing are listed as the factors threatening the Sierra Valley population.

The above referenced Status Report states that the Dog Valley ivesia (*Ivesia aperta* var. *canina*) grows near the Dog Valley site of Webber's ivesia. This plant is endemic to Dog Valley, and the threats described above for the Dog Valley population of Webber's ivesia hold true for Ivesia *aperta* var. *canina*.





#### SPECIAL PLANTS AND WILDLIFE

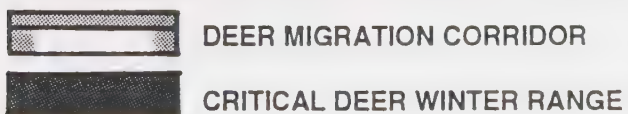
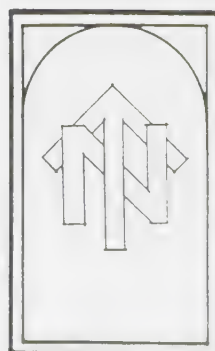


FIGURE 13-5

DOG VALLEY WATERSHED

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## **Little Truckee Watershed**

The Little Truckee River Watershed has a large number of special biological areas, including the Little Truckee River, three major lakes, Perazzo Meadows, Kyburz Flat, Sardine Valley, the Stampede Valley deer migration corridor, and several special plants and animals. These various areas are described below.

Little Truckee River. Three major lakes of Sierra County are in the Little Truckee River area: Independence Lake, Webber Lake and Stampede Reservoir. Perazzo Meadows and Kyburz Flat are two sensitive areas along the Little Truckee River. These lakes and sensitive areas are discussed in more detail under the subheadings which follow the description below of the overall Little Truckee River area.

The Little Truckee River is second only to the North Fork of the Yuba River in important fishery habitat. The section between Perazzo Creek and Sierra Valley Diversion Dam is the most productive area of the stream because it runs through many meadows; it is also the most sensitive. Between Independence Creek and Stampede Reservoir, it supports the most angling use; and there is a campground and a highway which facilitates use. The primary tributaries, Sagehen Creek and Perazzo Creek, support Eastern brook trout, brown trout and rainbow trout. Independence Creek supports brown trout.

Deer from the Loyalton Truckee and the Nevada City deer herds use this area in the summer; it is also a migration corridor for the Loyalton Truckee herd. Spring and summer are crucial times for fawn survival; the vegetation provides nutritious browse for pregnancy and nursing, as well as cover.

An initial application WHR System background information suggests that the following special species may occur in the Little Truckee River area:



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# SPECIAL PLANTS AND WILDLIFE

- DEER MIGRATION CORRIDOR
- CRITICAL DEER SUMMER RANGE
- OTHER SENSITIVE AREAS
- WATER COURSES / RESERVOIRS
- DEER FAWNING AREAS

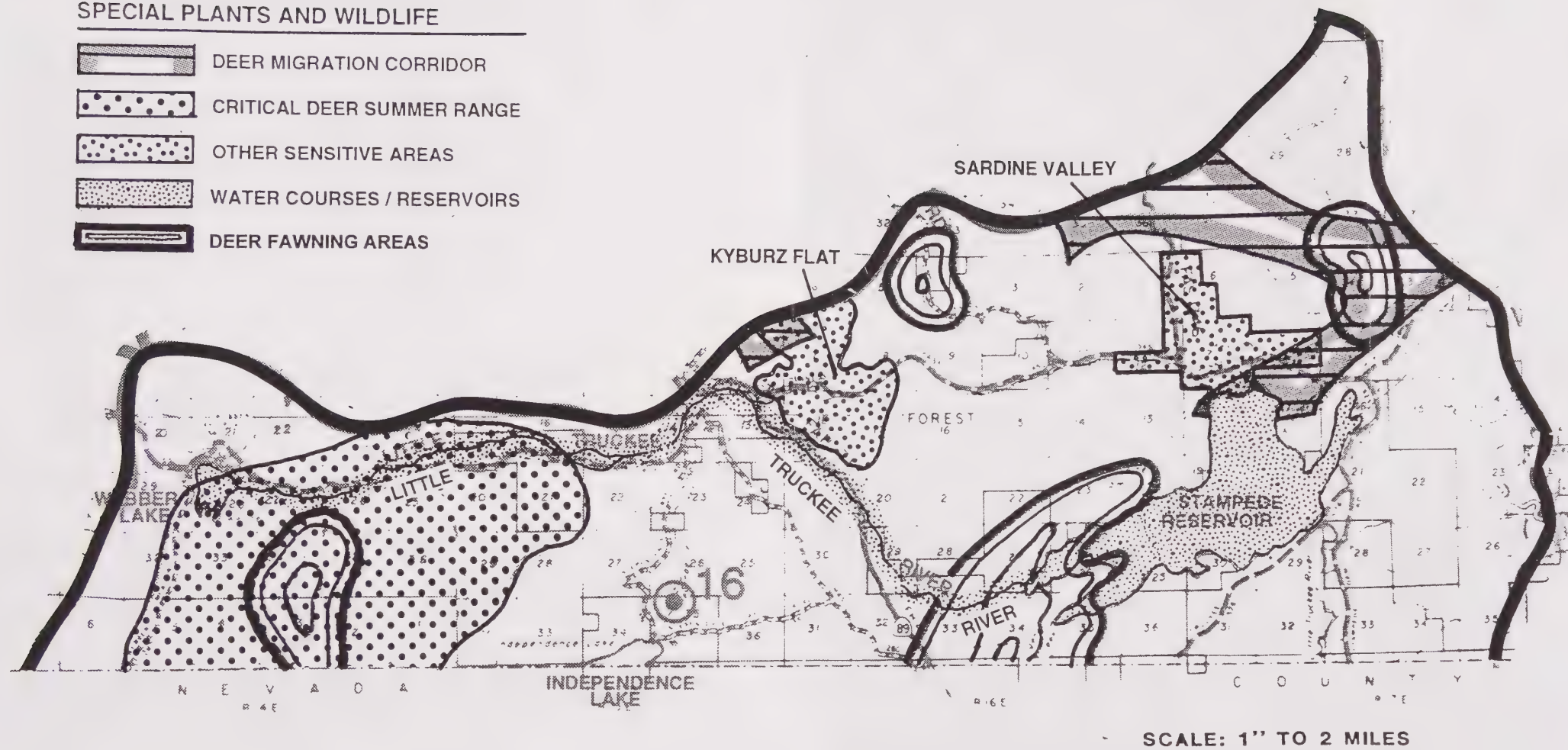


FIGURE 13-6

LITTLE TRUCKEE RIVER WATERSHED







**Table 13-14**  
**LITTLE TRUCKEE RIVER AREA**  
**PREDICTED WILDLIFE SPECIAL SPECIES**

Osprey	Northern harrier
Goshawk	Golden eagle
Spotted owl	Yellow warbler
Savannah sparrow	Song sparrow
Vagrant shrew	Little brown myotis
Townsend's big-eared bat	White-tailed hare
Mountain beaver	Northern flying squirrel
Western harvest mouse	Deer mouse
Fisher	Badger
Western spotted skunk	Mountain lion
Bald eagle	Peregrine falcon
Blue grouse	Ringtail
Wolverine	Willow Flycatcher

SOURCE: California Department of Fish and Game,  
California Wildlife Habitat Relationship System.  
California's Wildlife, Vols. I-III.

Sightings are discussed under each subarea.

The Little Truckee River corridor is under a mix of public and private ownership. The majority of its reach is within Tahoe National Forest's Hennessy Management Area. The management practices most relevant to the Little Truckee River are fisheries and wet meadow habitat improvements and maintenance. The most significant related concern with private land use activities is water quality degradation. Heavy dispersed camping and extensive timber harvest are of particular concern (Tahoe National Forest Management Plan, p. V-148).

Stampede Reservoir. Stampede Reservoir is the largest most heavily used body of water in the County. Primary CALVEG habitats are basin sagebrush and Jeffrey pine. California Wildlife Habitat Relationship Systems habitats include Sierran mixed conifer, Jeffrey pine, and sagebrush.

In addition to the special species found throughout the Little Truckee River area, the following species are predicted to occur in the Stampede Reservoir area or have been sighted there:



**Table 13-15**  
**LITTLE TRUCKEE RIVER AREA: STAMPEDE RESERVOIR**

**Special Wildlife Species Predicted<sup>1</sup>**

Pallid bat	Long-eared owl
Sharp-shinned hawk	Cooper's hawk
Yellow Warbler	Common yellow-throat
Willow Flycatcher	

**Special Species Sighted<sup>2</sup>**

Bald eagle	Plumas ivesia
------------	---------------

SOURCE: <sup>1</sup>California Department of Fish and Game, California Wildlife Habitat Relationship System, California's Wildlife, Vols. I-III.

<sup>2</sup>California Department of Fish and Game, Natural Diversity Data Base.

There is one bald eagle nesting site at Stampede Reservoir (Syd Kahre, Personal Communication, 1991).

Stampede Reservoir is part of the Tahoe National Forest; Stampede-Boca Management Area management practices include fisheries, forest, and wet meadow habitat improvement and maintenance with an eye toward bald eagle, osprey, trout, Kokanee salmon and willow flycatchers. The primary related consideration on private land is potential water quality degradation from upstream land uses. The most proximate privately-owned watershed area is within the Sardine Valley.

Perazzo Meadows. Wetlands in Perazzo Meadows are significant areas for wildlife. CALVEG habitats include the mixed conifer fir habitat. California Wildlife Habitat Relationship Systems habitats include Sierran mixed conifer and white fir habitats.

In addition to the special management species found throughout the Little Truckee River area, the following species are predicted to occur in Perazzo Meadows or have been sighted there:



**Table 13-16**  
**LITTLE TRUCKEE RIVER AREA: PERAZZO MEADOWS**

**Special Wildlife Species Predicted<sup>1</sup>**

Sharp-shinned hawk  
Long-eared owl

Cooper's hawk  
Yellow Warbler

**Special Species Sighted<sup>2</sup>**

Wolverine

SOURCE: <sup>1</sup>California Department of Fish and Game, California Wildlife Habitat Relationship System, California's Wildlife, Vols. I-III.

<sup>2</sup>California Department of Fish and Game, Natural Diversity Data Base.

Perazzo Meadows is under a mix of public and private ownership. It is located within Tahoe National Forest's Hennessy Management Area. The Management Practices listed which seem to most apply to Perazzo Meadows are fisheries improvements and maintenance and wet meadow habitat improvement and maintenance. The practice related to wet meadows is described in the following excerpt from the Tahoe National Forest Management Plan, (page V-57):

**C9 Wet Meadow Habitat Improvement and Maintenance**

Intensively manage, maintain, or improve habitat (10 acres or more) for wetlands species. Practices may include activities such as: construction of potholes or shallow marshes, development of forage and cover, construction of nest boxes, islands, mounds, and human access control. MIS species include: Canada geese, mallards, and wood ducks.

**Direction:**

Canada Geese - Where featured, construct nesting islands where feasible and supplement islands with nesting platforms.

Mallards - Where featured, blast potholes in rank vegetation and establish food plants in open water areas lacking food supply.

Wood Ducks - Where featured, construct and place wood duck nesting boxes in areas lacking natural nesting places (V-57).

Retention and improvement of Willow Flycatcher habitat is specifically mentioned (p. V-149). Also, the potential to introduce Lahontan cutthroat



trout in Perazzo Creek is cited in the Lola Management Area discussion (p. V-215). Private lands upstream and downstream of the meadows raise the possibility of degradation or blockage of Perazzo Creek.

Independence Lake CALVEG habitats at Independence Lake include Mixed conifer fir and Montane mixed shrub habitats. California Wildlife Habitat Relationship Systems habitats include Sierran mixed conifer and White fir habitats.

The upper part of Independence Creek has been shown to be an important spawning ground for Lahontan Cutthroat trout, a U.S. Department of Interior threatened fish, Lahontan cutthroat trout from Pyramid Lake were once abundant in the Truckee and Little Truckee Rivers; now a small relic population of less than 100 individuals inhabit Independence Lake (California Department of Fish and Game. "Sierra County Wildlife Conservation Element").

In addition to the species found throughout the Little Truckee River area, the following special species are predicted to occur at Independence Lake or have been sighted there:

**Table 13-17**  
**LITTLE TRUCKEE RIVER AREA: INDEPENDENCE LAKE**  
**Special Wildlife Species Predicted<sup>1</sup>**

Cooper's hawk	Long-eared owl
Snowshoe hare	Lahontan cutthroat trout

**Special Species Sighted at Independence Lk.<sup>2</sup>**

Lahontan cutthroat trout	Wolverine
Osprey	Anthony's green heron
Ferruginous hawk	Fisher
Pine marten	Prairie falcon

SOURCE: <sup>1</sup> California Department of Fish and Game, California Wildlife Habitat Relationship System. California's Wildlife, Vols. I-III.

<sup>2</sup> Independence Lake Environmental Assessment Project and California Department of Fish and Game, Natural Diversity Data Base.

The lands immediately surrounding Independence Lake are privately



owned, but the National Forest is nearby. The Lola and Sagehen Basin Management Areas of the Tahoe National Forest flank the privately-owned Independence Lake lands. Management practices for these areas include fisheries, meadow, and forest habitat improvement and maintenance and some off-highway vehicle restrictions. Lahontan cutthroat and willow fly catcher are two species called out in the Forest Plan. However, the Plan's discussion of Issues, Concerns and Opportunities at the Lola Management Area mentions the possibility of some coordination with private land owners in developing a recreation complex (Tahoe National Forest Plan, page V-215).

**Kyburz Flat** The Kyburz Flat wetlands are very important to wildlife. CALVEG habitats include Jeffrey Pine habitat. California Wildlife Habitat Relationship Systems habitats include Jeffrey Pine and Sierran mixed conifer habitats.

In addition to the species found throughout the Little Truckee River area, the following special species are predicted to occur at Kyburz Flat or have been sighted there:

**Table 13-18**  
**LITTLE TRUCKEE RIVER AREA: KYBURZ FLAT**

**Special Wildlife Species Predicted<sup>1</sup>**

Long-eared owl	Cooper's hawk
----------------	---------------

**Special Species Sighted at Kyburz Flat<sup>2</sup>**

Six to 8 years ago (mid- to early 1980's) nesting was reported for sandhill crane

SOURCE: <sup>1</sup> California Department of Fish and Game, California Wildlife Habitat Relationship System.

<sup>2</sup> Kahre, personal communication, 1991.

Other management practices at Kyburz include restrictions on Off-Highway Vehicle use, camping, and grazing distribution. One private parcel abuts the publicly-owned Kyburz area on the west and some potential may exist for uses which conflict with Forest Service management practices.

**Webber Lake** Webber Lake is an important natural meadow lake and gets lots of use by both wildlife and recreationists. CALVEG habitat types



include lodgepole pine, mixed fir, perennial grassland and red fir habitats; California Wildlife Habitat Relationship System habitat types include sub-alpine conifer, white fir, Sierran mixed conifer, wet meadow and red fir.

In addition to the species found throughout the Little Truckee River area, the following special species are predicted to occur at Webber Lake or have been sighted there:

**Table 13-19**  
**LITTLE TRUCKEE RIVER AREA: WEBBER LAKE**  
**Special Wildlife Species Predicted<sup>1</sup>**

Willow flycatcher	Snowshoe hare
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**Species Sighted at Webber Lake**

Willow flycatcher	Fisher
Donner Pass buckwheat	Sierra sedge

Note: A bald eagle nest has been reported at Webber Lake, but has yet to be investigated (Kahre, personal communication).

SOURCE: <sup>1</sup> California Department of Fish and Game, California Wildlife Habitat Relationship System. California's Wildlife, Vols. I-III.  
Independence Lake Environmental Assessment Project and California Department of Fish and Game, Natural Diversity Data Base.

The water quality effect of extensive timber harvest on public and private lands is the most relevant land management concern noted in the Tahoe National Forest Land and Resource Management Plan (p. V-148).

NDDDB Special Animals Recorded. The various species predicted and sighted in various areas of the Little Truckee River Watershed are listed above. The descriptions below are only of those species which have been recorded and which have not been described in previous sections.

A bald eagle nesting site has been recorded at Stampede Reservoir. The bald eagle is State and federally listed as Endangered. It inhabits wetland and forest habitats, and breeds mainly in mountainous habitats near reservoirs, lakes, and rivers, in the northern one-third of the State. The number of breeding pairs in California is about 90. The breeding population is increasing and the winter population appears stable (California Department of Fish and Game, 1991, p. 33).



Numerous occurrences of willow flycatcher have been recorded along the Little Truckee River. The willow flycatcher is State listed as Endangered and is a federal candidate for listing. It has been eliminated from its former status as a common summer resident throughout California to only five populations in isolated meadows of the Sierra Nevada and along four rivers in southern California. The total population estimate for California is about 200 pairs of willow flycatchers. Riparian habitat loss, grazing, and nest parasitism are factors named in their decline (DFG, 1991, p. 45).

Greater sandhill cranes were sighted at Kyburz Flat several years ago. This species is State listed as Threatened. Currently, greater sandhill cranes nest in Lassen (75 pairs), Modoc (165 pairs), Plumas (7 pairs), Shasta (1 pair), Sierra (1 pair), and Siskiyou (27 pairs) counties. (Numbers based on 1988 surveys.) No surveys have been conducted since 1988 but the population trend of this species is thought to be stable/declining (California Department of Fish and Game, 1991, pp. 38-39).

Osprey have been recorded at Independence Lake. Osprey is a California Species of Special Concern. The bird preys mostly on fish and commonly breeds near water. The breeding range in northern California is the Cascade Range, the Sierra south to Lake Tahoe, and the Coastal Range, south to Marin County. Regular breeding sites include Shasta Lake, Eagle Lake, Lake Almanor, and other inland lakes and rivers. The breeding population was estimated to be 350-400 pairs in 1975, and have been apparently increasing in recent years (California Department of Fish and Game, November 1990, p. 118).

The ferrugineous hawk, also reported at Independence Lake, is a California Species of Concern. It breeds in Oregon north to Canada and is an uncommon winter resident and migrant in various parts of the State (California Department of Fish and Game, November 1990, p. 138).

Wolverine have been recorded in the Independence Lake area; it is State-listed as Threatened and is a federal candidate for listing. The wolverine is the second largest member of the weasel family (the sea otter is the largest). It resembles a small, short-legged bear with a shaggy coat and bushy tail. An early 1980's population estimate of 50 to 100 animals is used in the absence of data on this elusive animal. The population trend is unknown (California Department of Fish and Game, 1991, p. 27).

Pine marten sightings are also from the Independence Lake area — it is a Forest Service Sensitive species. The marten is a permanent resident of the North Coast regions and the Sierra Nevada, Klamath, and Cascades



Mountains. Optimal habitats are various mixed evergreen forests with more than 40% closure and large trees and snags (California Department of Fish and Game, April 1990, pp. 300-301).

Fisher sightings also have been made in the Independence Lake and Webber Lake areas — it is a California Species of Special Concern and a Forest Service Sensitive Species. It is an uncommon permanent resident of the Sierra Nevada, Cascades, Klamath Mountains, and a few locations in the North Coast Ranges. It occurs in intermediate to large tree stages of coniferous forests and deciduous-riparian habitats with a high percent canopy closure (California Department of Fish and Game, April 1990, pp. 302-303).

Spotted bat sightings are recorded from the Independence Lake area. The spotted bat is considered to be one of North America's rarest mammals, but has no legal status. Its normal range in California is south of Sierra County (California Department of Fish and Game, April 1990, pp. 66-67).

Lahontan cutthroat trout are recorded in Independence Lake and upper Independence Creek. This giant trout is federally listed as Threatened. It once was common in lakes and streams throughout the Lahontan basin of eastern California and a north-central Nevada where it supported a substantial commercial fishery and popular sport fishery. Today it is limited to small remnant populations in a few isolated tributaries of the Truckee, Carson, and Walker rivers. Impassible dams, excessive diversions, commercial overharvesting, and competition from and hybridization with non-native trout are factors in the decline. Preservation of the subspecies' gene pool is considered important due to the alkalinity tolerance, and the CDFG has initiated a program to remove non-native fish from selected streams (California Department of Fish and Game, 1990, pp. 36-37).

Donner Pass buckwheat (*Eriogonum umbellatum* Torr. var. *torreyanum*) has been reported approximately two miles south of Webber Lake. This plant occurs in a few highly restricted populations in Nevada, Placer and Sierra Counties and is endemic to California — it is considered by the CNPS to be vulnerable and eligible for state listing (CNPS, September, 1988, p. 51).

Its habitat is dry, gravelly or stoney sites, often in harsh exposures such as ridge tops or steep slopes; generally it is at desert-like sites between 6000 to 8000 feet. The number of occurrences of this plant has declined on the TNF since it was first detected. It is a Forest Service Sensitive Plant recommended by the Tahoe National Forest for total protection as part of



the TNF Sensitive Plant Program Standards and Guidelines (USFS, Tahoe National Forest, November 1992).

Sierra sedge (*Carex paucifructus*) has been reported just south of Webber Lake. It is a federal candidate species endemic to California, occurring in El Dorado, Sierra, and Tuolumne Counties. This species is on the CNPS review list due to a lack of information (CNPS, September 1988, p. 23). Little is known of this plant's habitat, but it is thought to occur in moist situations on red fir and subalpine forests (CNPS, Rare Plant Status Report, March 1979).

### **Pass Creek & Middle Fork of the Yuba**

Jackson Meadow Reservoir, Milton Reservoir, and the Middle Fork of the Yuba River are the central special features of these two watersheds. Other areas of special concern are zones of ultra mafic rocks where special plants and natural communities may occur, and a location where Cantellow's *Lewisia* has been recorded.

Middle Fork of the Yuba River. The Middle Fork of the Yuba River is the second largest stream in the County. It is under a mix of public and private ownership. The Hour House Area, Footes Crossing, Jackson Meadow's Reservoir and Milton Reservoir are of particular value to wildlife. Between Kanaka Creek and the Yuba/Sierra County line, the water is often too warm and receives silted runoff from old placer mines and other sources; it only supports a small trout population (1977 Wildlife Conservation Element, page 80). In contrast, upstream between Kanaka Creek and Milton Reservoir, it is considered a "roadless area" and it supports many trout. Kanaka Creek, Oregon Creek and Pass Creek are the primary tributaries. Kanaka Creek supports rainbow trout and has more mining claims along its banks than any other Sierra County stream. Oregon Creek is substantially degraded with silt and high temperatures, but it still supports a fair rainbow trout population. Jackson Meadow's Reservoir and Milton Reservoir are on the Middle Fork of the Yuba River. Milton Reservoir is bordered by meadow and marsh areas.

Initial application of WHR System background information suggests that the following special animal species could occur in the entire Middle Fork of the Yuba River area (one plant species has been sighted as listed below):



**Table 13-20**  
**MIDDLE FORK OF THE YUBA RIVER**

**Special Wildlife Species Predicted<sup>1</sup>**

Mountain beaver	Northern flying squirrel
Western harvest mouse	Deer mouse
Badger	Spotted bat
River otter	Mountain lion
Bald eagle	Peregrine falcon
Blue grouse	Osprey
Goshawk	Golden Eagle
Spotted owl	
Snowshoe hare	

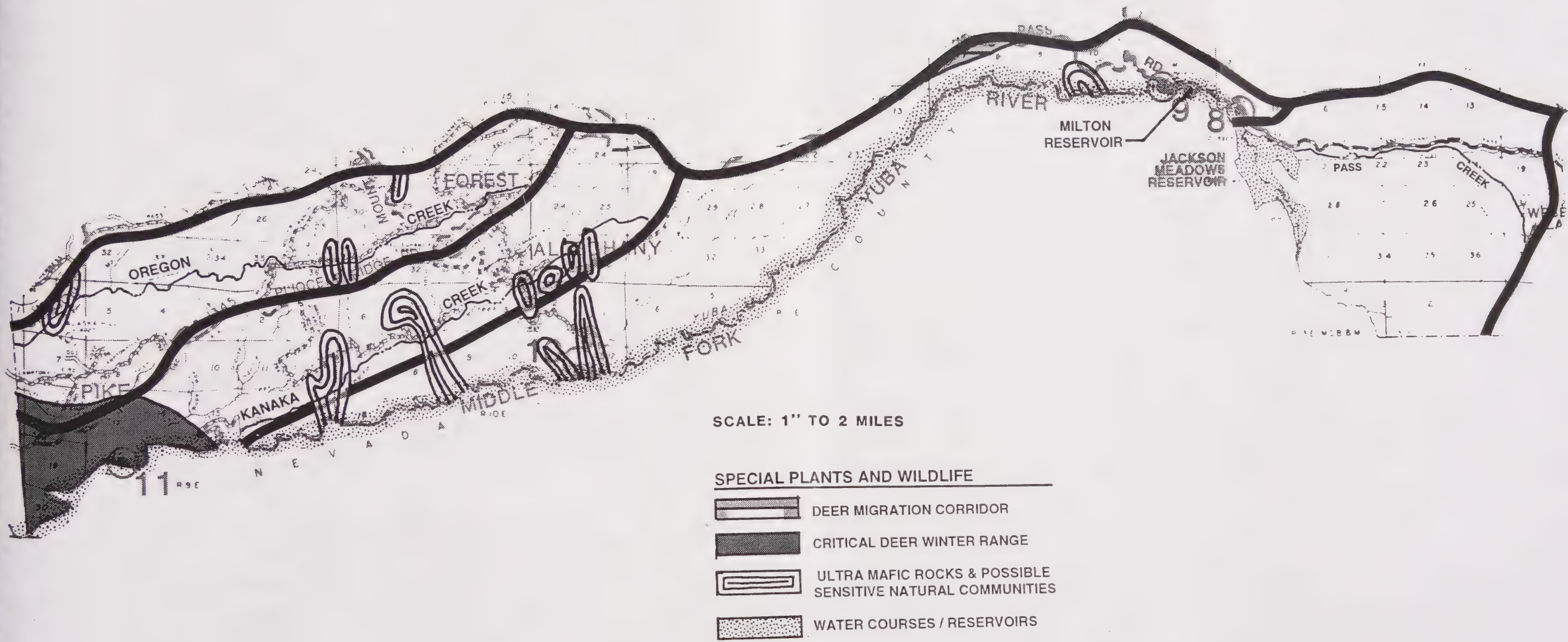
**Special Species Sighted at Kanaka Creek<sup>2</sup>**

Cantelow's Lewesia

SOURCE: <sup>1</sup> California Department of Fish and Game, California Wildlife Habitat Relationship System. California's Wildlife", Vols. I-III.

<sup>2</sup> California Department of Fish and Game, Natural Diversity Data Base.





**FIGURE 13-7**  
**OREGON & KANAKA CREEKS, MIDDLE YUBA**  
**& PASS CREEK WATERSHEDS**









As shown above, Cantelow's Lewisia (*Lewisia cantelowii*) has been recorded in the Kanaka Creek area. This California endemic is thought to be vulnerable because of horticultural collecting and is considered eligible for state listing by the CNPS (CNPS, September 1988, p.70). Its habitat includes moist rock outcrops and cliffs within yellow pine forest at 1500 to 3000 feet. It is found in Sierra, Plumas, and Nevada Counties, along the Feather and Yuba Rivers. It is a Forest Service Sensitive Plant, recommended for total protection as part of the TNF Sensitive Plant Program Standards and Guidelines described under "Related Plans" (USFS, Tahoe National Forest, November 1992).

Jackson Meadow's Reservoir / Milton Reservoir. Like the other large lakes, Jackson Meadow's Reservoir receives a lot of fishing and camping use. The CALVEG habitat type is Mixed conifer fir habitat. The California Wildlife Habitat Relationship System habitats are Sierran mixed conifer and white fir habitats.

Deer from the Loyalton Truckee herd and Nevada City herd use this area in the summer. The Downieville herd is often seen in the Jackson Meadow's Reservoir area, but they primarily use Haypress Valley. Spring and summer is a crucial time for fawn survival due to availability of browse for pregnancy and nursing.

In addition to the species found throughout the Middle Fork of the Yuba River area, the WHR System background information suggests that the following special species may occur at Jackson Meadow's Reservoir and Milton Reservoir:

**Table 13-21**  
**MIDDLE FORK OF THE YUBA RIVER:**  
**JACKSON MEADOWS AND MILTON RESERVOIRS**

**Special Wildlife Species Predicted**

Black swift	Willow flycatcher
White-tailed hare	Fisher
Ringtail	Wolverine

SOURCE: California Department of Fish and Game, California  
Wildlife Habitat Relationship System. California's Wildlife Vols. I-III.

The two reservoirs are located within Tahoe National Forest's Milton-Jackson Management Area in which "Late Seral Stage Vegetation Management" practices targeted, at least in part, for a portion of a spotted



owl habitat area (SOHA) located there (Tahoe National Forest Land and Resource Management Plan p. V-181 to V-182).

Among the issues cited are the planned construction of a hydroelectric plant on the dam at Jackson Meadows Reservoir and overuse by recreationists (page V-181). Possible concerns on private lands are recreation, timber harvest, or any other activities which may degrade water quality or suitable habitat for spotted owl.

**Haypress Creek Watershed**

The prominent features of the Haypress Creek Watershed, aside from various streams are the Bald Ridge and Great Eastern Ravine deer migration corridors. These joined corridors are paths of the Downieville deer herd in its movement from winter to summer range.

**Sulfur Creek Watershed**

The principal biological feature of the Sulfur Creek Watershed, aside from streams, is the Carman Creek/Sulphur Creek deer migration corridor, utilized by the Loyalton Truckee Deer Herd.

**North Yuba & Lakes Basin Watersheds**

The North Yuba River and the Lakes Basin are prominent features of these watersheds. The Middle Waters/Henness Pass Road deer migration corridor, ultra mafic rock areas, and sightings of fisher, Spiny Rhyacophilan Cadisfly, and Darlingtonia Seep are other known important features.

**Fiddle Creek Watersheds**

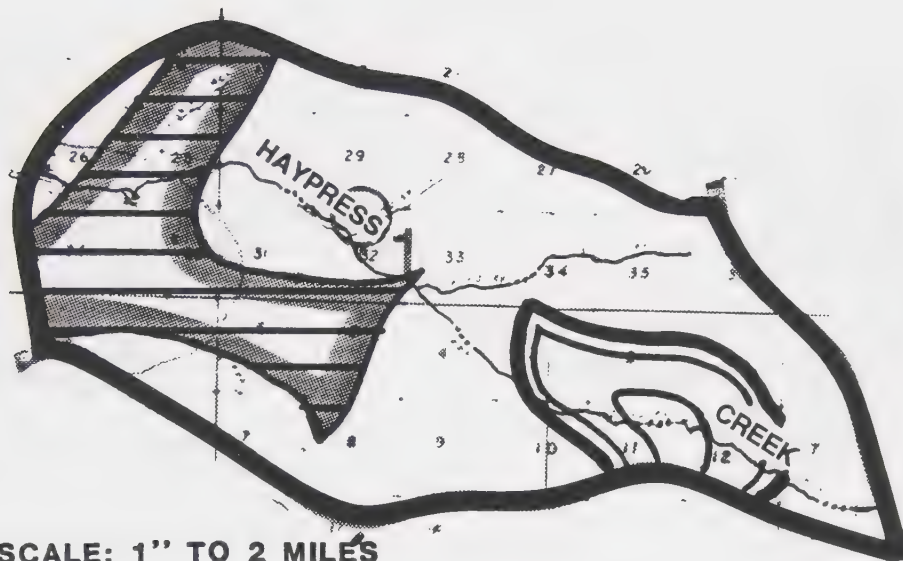
North Fork of the Yuba River. The North Fork of the Yuba River is recommended as an important recreational fishery. Many of its rainbow trout and brown trout are born and raised in its tributaries which are listed in Table 13-22. Fiddle Creek, Goodyear's Creek and Woodruff Creek are the main tributaries. A small dam on Fiddle Creek diverts water to Indian Valley. Goodyear's Creek has a number of mining claims which may affect water quality.

**Table 13-22  
NORTH FORK OF THE YUBA RIVER TRIBUTARIES**


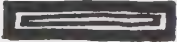
Canyon Creek	Cherokee Creek
Deer Creek	Downie Creek
Fiddle Creek	Goodyear's Creek
Haypress Creek	Lavezzola Creek
Lincoln Creek	Packer Creek
Pauley Creek	Sawmill Creek
Slate Creek	Woodruff Creek

SOURCE: USGS Quad Sheets.

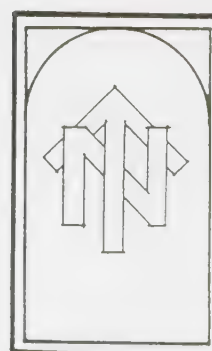




#### SPECIAL PLANTS AND WILDLIFE

-  DEER MIGRATION CORRIDOR
-  DEER FAWNING AREAS

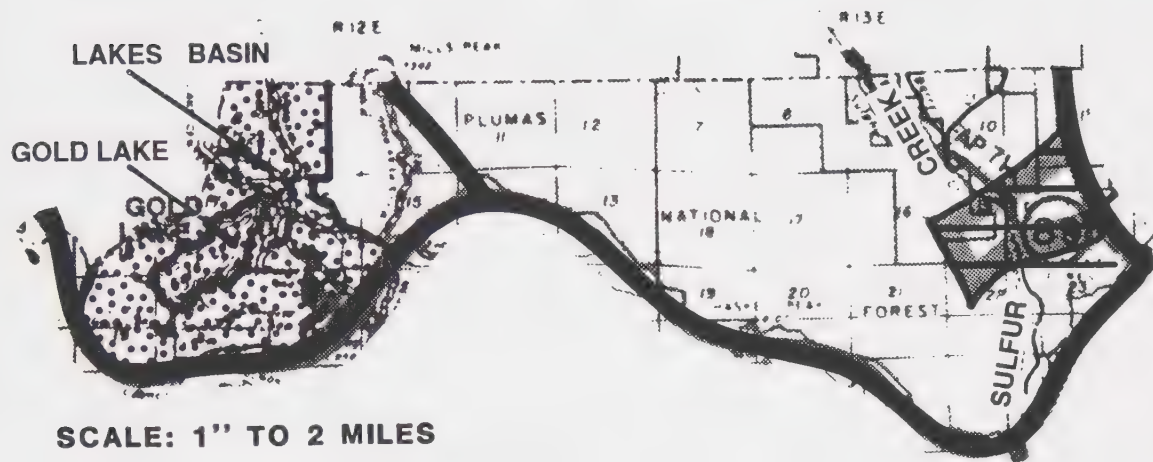
**FIGURE 13-8**  
**HAYPRESS CREEK WATERSHED**  
**13 - 71**





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#### SPECIAL PLANTS AND WILDLIFE



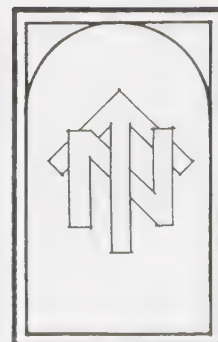
DEER MIGRATION CORRIDOR



WATER COURSES / RESERVOIRS

**FIGURE 13-9**

**GOLD LAKE & SULFUR CREEK  
WATERSHEDS**





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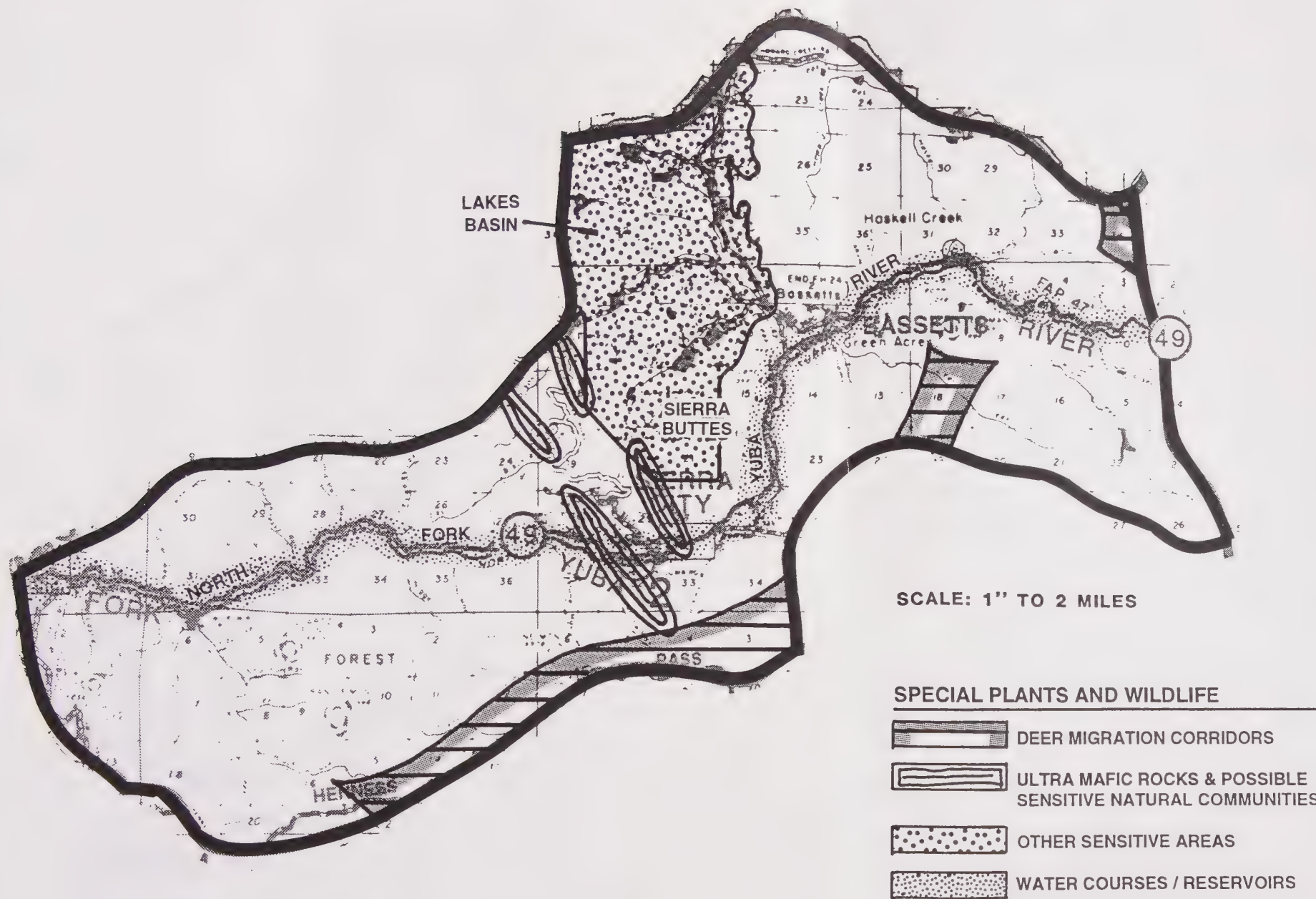
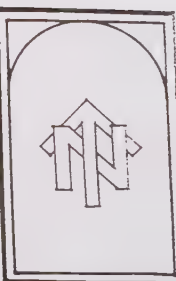


FIGURE 13-10

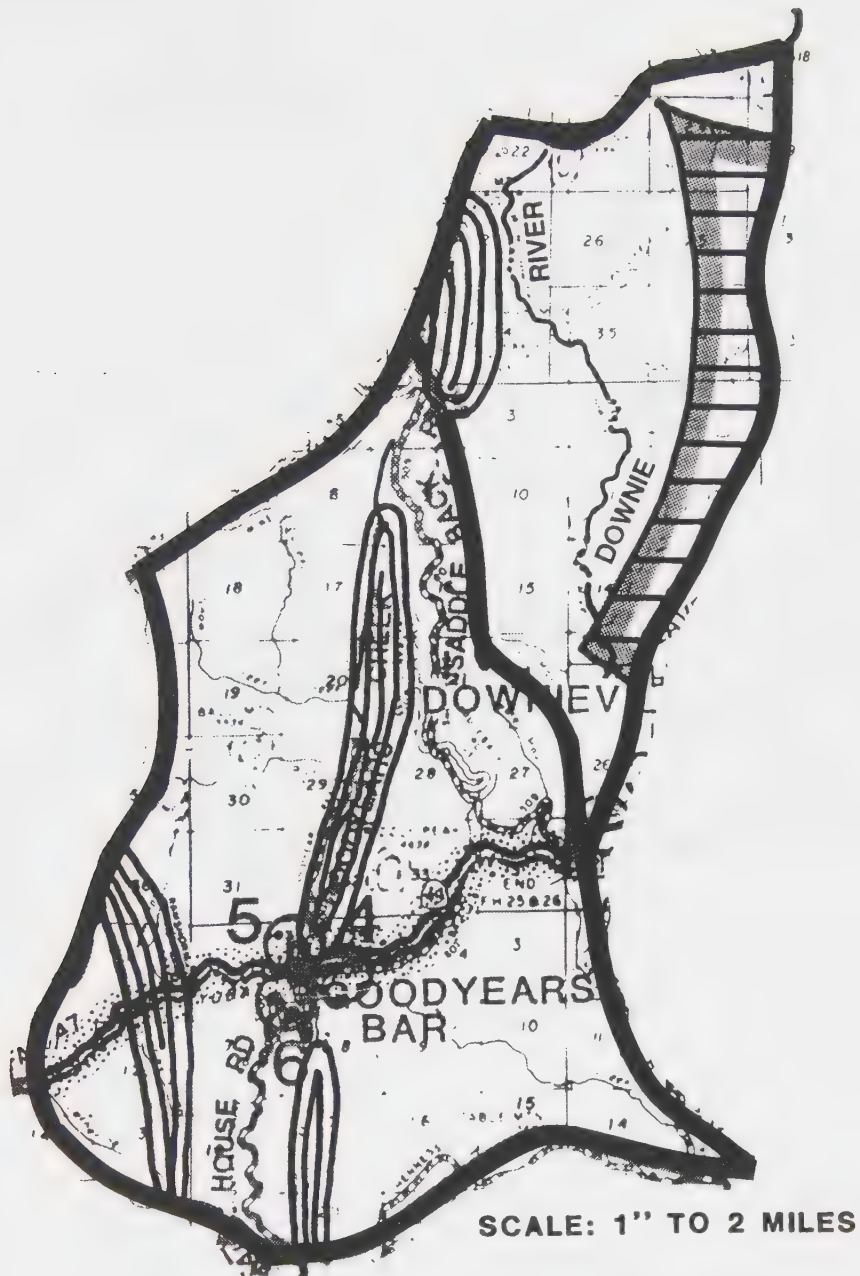
NORTH YUBA RIVER WATERSHED











### SPECIAL PLANTS AND WILDLIFE



DEER MIGRATION CORRIDOR



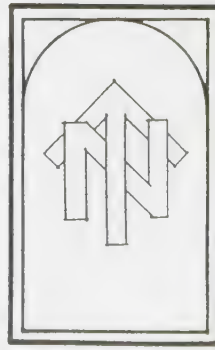
ULTRA MAFIC ROCKS & POSSIBLE  
SENSITIVE NATURAL COMMUNITIES



WATER COURSES / RESERVOIRS

**FIGURE 13-11**

**GOODYEARS CREEK & DOWNIE RIVER  
WATERSHEDS**







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### SPECIAL PLANTS AND WILDLIFE

-  ULTRA MAFIC ROCKS & POSSIBLE SENSITIVE NATURAL COMMUNITIES
-  WATER COURSES / RESERVOIRS

**FIGURE 13-12**  
**FIDDLE CREEK WATERSHED**



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The CALVEG habitat types in the basin of the North Fork of the Yuba River include canyon live oak, black oak and mixed conifer pine. California Wildlife Habitat Relationship Systems habitats include montane hardwood, montane hardwood-conifer, Sierran mixed conifer and ponderosa pine.

A lot of the areas in the North Fork of the Yuba River basin are important winter range for the Downieville herd. They are also important in the spring and summer months because many of the deer do not migrate higher. The Goodyear's Bar-Grizzly Peak and Ramshorn Creek area make up the largest Downieville herd winter range. Indian Valley makes up the second largest winter range. North of Highway 49, Port Wine Ridge and Morrison Ridge are important migration corridors.

Initial application of WHR System background information suggests that the following special species listed in the first part of Table 13-23 may occur in the North Fork of the Yuba River at Goodyear's Bar and Indian Valley, as shown in the second part of Table 13-23, one special species and one special natural community have been recorded in the area.

**Table 13-23**  
**NORTH FORK OF THE YUBA RIVER AREA:**  
**GOODYEAR'S BAR & INDIAN VALLEY**

**Special Wildlife Species Predicted<sup>1</sup>**

Osprey	Goshawk
Golden eagle	Spotted owl
Yellow warbler	Townsend's big-eared bat
Snowshoe hare	Mountain beaver
Northern flying squirrel	Western harvest mouse
Deer mouse	Ringtail
Badger	Western spotted skunk
River otter	Mountain lion
Bald eagle	Peregrine falcon
Blue grouse	

**Special Species / Natural Communities Sighted near  
North Fork of the Yuba River<sup>2</sup>**

Spiny Rhyacophilan Cadisfly (Downieville and Downie River)  
Darlingtonia seep

SOURCE: <sup>1</sup> California Department of Fish and Game, California Wildlife Habitat Relationship System. California's Wildlife. Vols. I-III.

<sup>2</sup> California Department of Fish and Game, Natural Diversity Data Base.



Sierra Buttes. This area includes the Sierra Buttes Recreation area in Tahoe National Forest and the Lakes Basin Recreation Area in Plumas National Forest; parts of the area are also under private ownership. Gold Lake is the most heavily used Sierra County Lake. Other Sierra Buttes lakes include:

**Table 13-24**  
**SIERRA BUTTES RECREATION AREA**  
**LAKE SYSTEM**

Deer Lake	Goose Lake
Haven Lake	Little Gold Lake
Packer Lake	Lower Salmon Lake
Upper Salmon Lake	Lower Sardine Lake
Upper Sardine Lake	Saxonia Lake
Snag Lake	Young American Lake
Volcano Lake	Gold Lake

SOURCE: Sierra County Wildlife Element, 1977

CALVEG habitat types in the area include red fir, lodgepole pine, mixed fir forest, montane mixed shrub and barren habitats. California Wildlife Habitat Relationship System habitats include red fir, sub-alpine conifer, lodgepole pine, Sierran mixed conifer, white fir and montane chaparral.

Various varieties of game fish have been introduced to most of these high elevation lakes. Non-game fish have also been introduced by illegal use of live bait. Chemical treatments have been applied to help control their competition with game fish.

The wide diversity of deer habitat makes this area extremely valuable for fawning, nursing and growth. Up to four herds converge on this area, the Sloat herd, the Downieville herd, the Doyle herd and the Loyaltan Truckee herd.

Initial application of WHR System background information suggests that the following species could occur in the Sierra Buttes area:



**Table 13-25**  
**SIERRA BUTTES RECREATION AREA**  
**PREDICTED SPECIAL WILDLIFE SPECIES**

Barrow's golden-eye	Osprey
Goshawk	Golden eagle
Spotted owl	Willow flycatcher
Snowshoe hare	White-tailed hare
Mountain beaver	Northern flying squirrel
Western harvest mouse	Ringtail
Fisher	Badger
River otter	Wolverine
Mountain lion	Bald eagle
Peregrine falcon	Blue grouse

SOURCE: California Department of Fish and Game, California Wildlife Habitat Relationship System. California's Wildlife, Vols. I-III.

Pine marten sightings at Gold Lake are not uncommon. A wolverine was sighted in 1990 at Sardine Lake (Syd Kahre, personal communication, 1991). Fishers have also been sighted (California Department of Fish and Game, Natural Diversity Data Base).

Heavily dispersed camping along waterways and potential hydro-electrical developments are the principal concerns related to fisheries in the area (Tahoe National Forest Land Resource Management Plan, page V-111). Prescribed management practices for the Lakes Basin Management Area (Tahoe National Forest include the full range of fisheries, forest, and meadow improvements, management and maintenance, page V-112). The Plumas National Forest Land and Resource Management Plan (1988) contains the following measures for the Lakes Basin Management Area:

**Table 13-26**  
**PLUMAS NATIONAL FOREST LAND &**  
**RESOURCE MANAGEMENT PLAN**  
**STANDARDS AND GUIDELINES (EXCERPTS)**

Wildlife (p. 4-324)  
 Protect and improve emphasis species habitat (5a).  
 Maintain pine marten habitat capability in the Lakes Basin compartment.

Prescriptions (p. 4-326)  
 RX-9 Riparian  
 RX-12 Spotted Owl Habitat

SOURCE: Plumas National Forest Land and Resource Management Plan, 1988.



The riparian prescription entails protecting water courses from: recreation, range use, timber harvest, water use, mineral extraction, energy development, and roads (pp. 4-91 to 4-94). The Spotted Owl interim guidelines discuss avoidance of damage from the same kinds of activities and the provision of 1000 acres of suitable habitat for each spotted owl territory (pp. 4-99 to 4-102).

Spring Rhyacophilan Cadisfly has been recorded in the Downie River near SR 49, north of Downieville — the insect is a federal candidate species for which insufficient information is available to make or reject a listing. It prefers cool, running water, but little else is known about its habitat requirements and life history (NDDDB, run date, November 7, 1991).

Darlingtonia seep has been recorded in a variety of forest settings generally northeast of Alleghany. It is a natural community of high NDDDB inventory priority due to limited occurrence. It is a type of bog containing the plant *Darlingtonia Californica* (California pitcherplant) which is on the CNPS watch list. Statewide it is considered threatened by horticultural collecting and mining (CNPS, September 1988, p. 38). Some of the Sierra County sightings note a threat from logging (NDDDB run date, November 1991).

**Pauley/  
Lavezzola Crk  
Watersheds**

The principal known features of this watershed are the Big Boulder Mine and Butcher Ranch deer migration corridors, and ultra mafic rock areas.

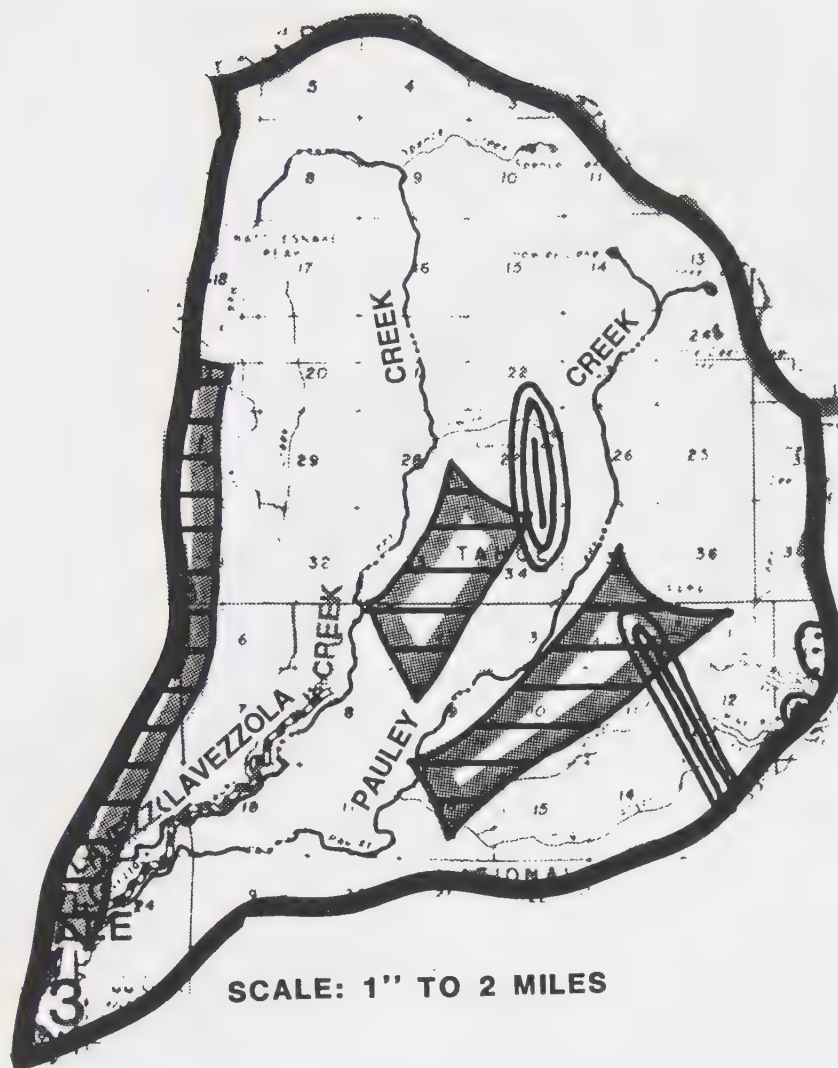
**Canyon Creek  
Watersheds**

The areas of special concern in this Watershed are the Port Wine Ridge deer migration corridor, ultra mafic rock areas, and a recorded location of short petaled campion.

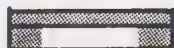
Short petaled campion (*Silene invisa*) has been recorded on the flanks of Mount Fillmore. It is a California endemic considered by the CNPS as being eligible for state listing (it is also a federal candidate). It is noted as being threatened by logging regionally (CNPS, September 1988, p. 107).

The plant is found in mixed conifer and red fir above 5600 feet, primarily in drainages, along meadow edges, and along forest edges. It is a Forest Service Sensitive Plant (USFS, Tahoe National Forest, November 1992). Short-petaled campion is known from fewer than sixty occurrences in northeastern California where one-third of these occurrences are declining or already have been eliminated. It is thought to be poorly adapted to disturbance. The populations are almost entirely on National Forest lands where the primary threat is logging, with ski area development, off





#### SPECIAL PLANTS AND WILDLIFE



DEER MIGRATION CORRIDOR



ULTRA MAFIC ROCKS & POSSIBLE  
SENSITIVE NATURAL COMMUNITIES

WATER COURSES / RESERVOIRS

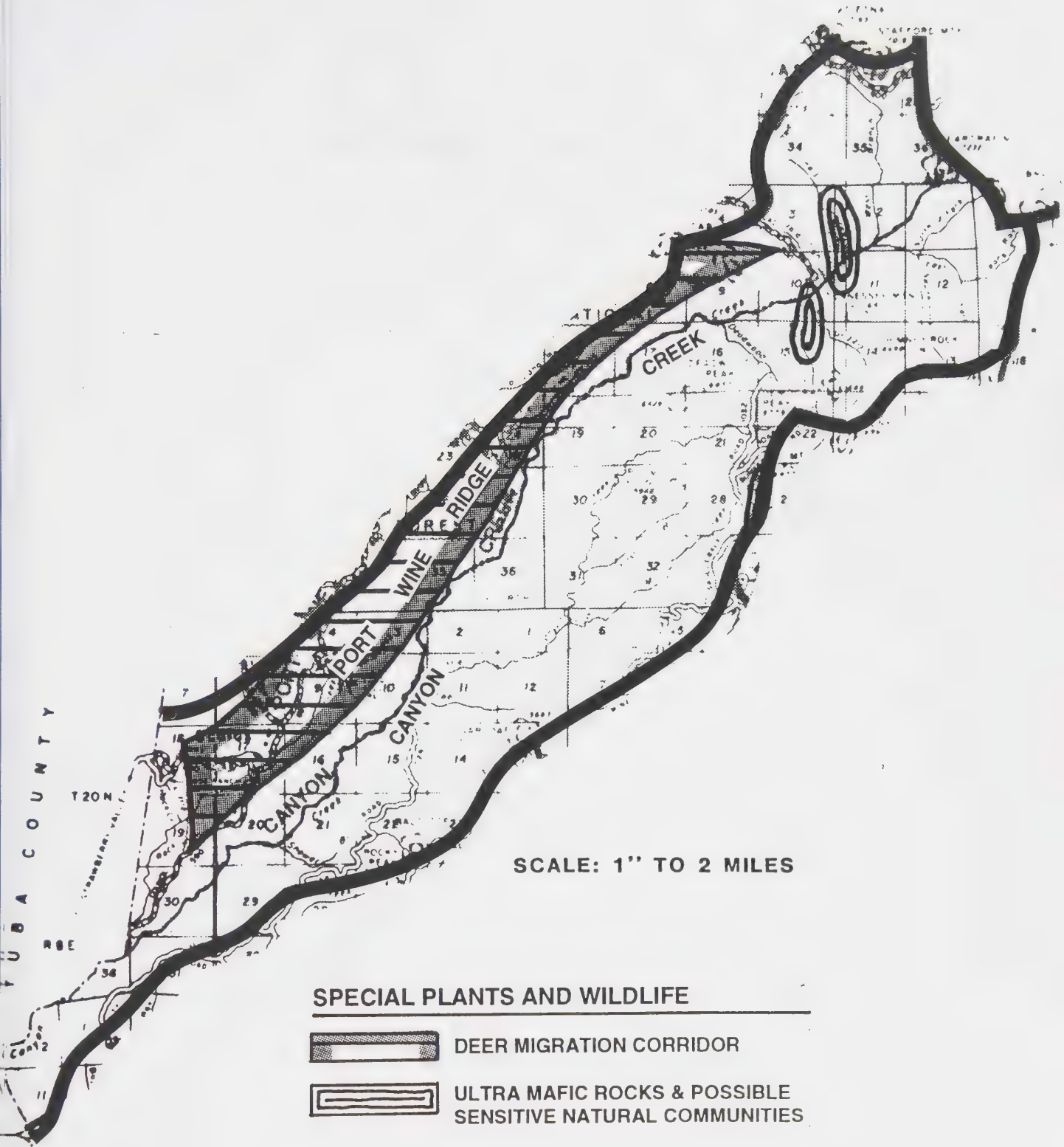
FIGURE 13-13  
LAVEZZOLA / PAULEY CREEKS  
WATERSHED





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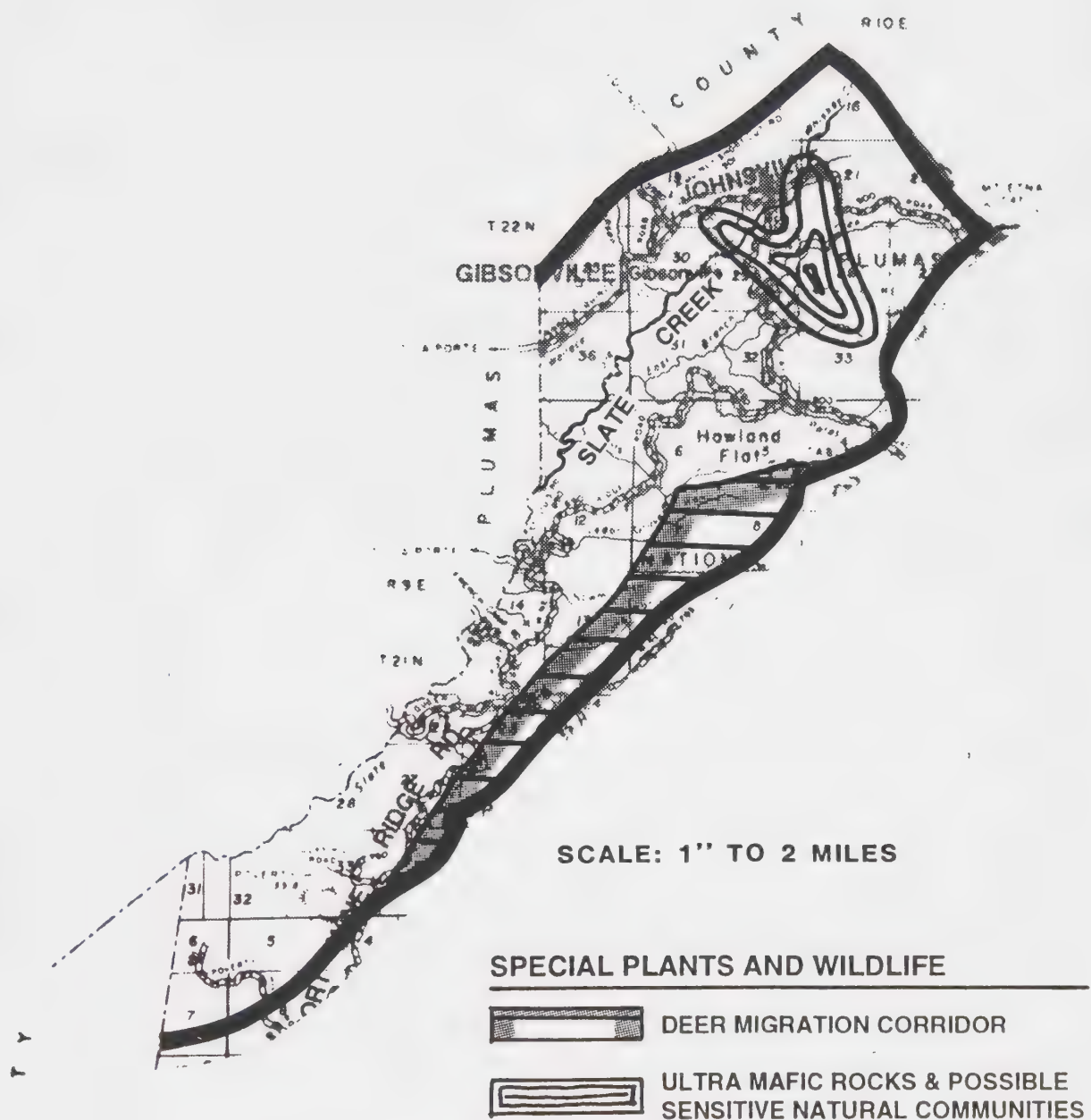
**FIGURE 13-14**  
**CANYON CREEK WATERSHED**



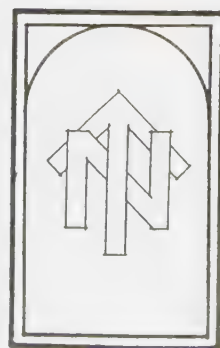


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**FIGURE 13-15**  
**SLATE CREEK WATERSHED**





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road vehicles, grazing, road construction, and mining (California's Native Plant Status Report, California Department of Fish and Game (DFG) Natural Diversity Data Base, in conjunction with the California Native Plant Society and DFG Endangered Plant Program. Revised. November 1988).

## **Slate Creek Watershed**

The areas of special concern in this watershed are ultra mafic rock areas and recorded locations of short-petaled campion, *Darlingtonia Seep*, and Constance's Rock Cress.

Constance's Rock Cress (*Arabis constancei*) is found on rocky open serpentine rocks at 3800-6600 feet. It is a Forest Service Sensitive Species recommended for total protection as part of its Sensitive Plant Program Standards and Guidelines discussed in the Related Plans section (USFS, Tahoe National Forest, November 1992). The plant is a California endemic found in Plumas and Sierra Counties and it is considered to be eligible for State listing by the CNPS; it is also a federal candidate for listing. It is thought to be threatened by mining and urbanization (CNPS, September 1988, p. 5).

## **Related Plans**

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## **Relationship to Plans**

Approximately 75% of the County is under the jurisdiction of the three National Forests—Tahoe, Plumas, and Toiyabe. The majority of the forest land in the County is within the Tahoe National Forest where land uses and activities are directed by the "Tahoe National Forest Land and Resource Management Plan" (1990). The following excerpts from that Plan indicate the general approach to wildlife management within the Forest—the Plan's more detailed standards and guidelines, including those for specific Management Areas are not printed below:

### **Goals and Desired Future Conditions**

#### **Wildlife and Fish**

1. Devote particular attention to preserving habitats for plant and animal species that are associated with mature forest successional stages, riparian areas, hardwoods, and meadows.
2. Manage fish and wildlife habitats to maintain viable populations of all vertebrate species.



3. Provide a diversity of plant and animal communities and tree species to meet visual, old-growth, and overall multiple use objectives; provide special elements (snags, logs, etc.) and critical habitats for dependent species.
4. Increase cold water fishery production.
5. Use recovery plans as the template for managing threatened and endangered species.
6. Provide enough quality habitat so that the Forest's sensitive species will not become threatened or endangered.

#### **Desired Future Condition**

The Tahoe National Forest will continue to work with other agencies, particularly the California Department of Fish and Game, U.S. Fish and Wildlife Service, and local Counties to implement, monitor, and adjust the Forest fish and wildlife management program so that it is satisfactory to each agency (see Appendix D) (p. V-8).

#### **Soil, Water, and Riparian Areas**

4. Protect streams, lakes, wetlands, streamside management zones, and other riparian areas (V-9).

The Forest Plan also contains detailed standards and guidelines for the Forest as a whole as well as for specific Management Areas; some of these standards and guidelines are considered in the Background Discussion section under the various "Areas of Concern."

The forest wildlife management direction has been at least temporarily altered by the "California Spotted Owl Sierra Province Interim Guidelines." This is discussed in the Timber Element.

The Background Discussion of certain plants makes reference to the Tahoe National Forest Sensitive Plant Program Standards and Guidelines (Tahoe National Forest, November 1992). This document addresses the Tahoe National Forest's one endangered plant and its fourteen sensitive plants. The Program is divided into three phases: 1) Inventory, 2) Interim Management, and 3) Recovery Management. The Inventory is intended to develop the initial body of information about sensitive plants. The Interim Management is meant to maintain viable populations until further action is taken — it includes planning, impact analyses, and monitoring functions, as well as plant collection control and interim management programs. Recovery Management is in its planning phase and a five year plan is set forth in the Program which outlined "action items" for the fifteen species by year. Common action items include monitoring, surveys of on-project areas,



and development of final guidance.

Two specific sets of Federal regulations which apply to projects on Federal, State, and private lands are the Section 404 Wetland provisions of the Clean Water Act and the Farming Security Act. These regulations are intended to protect wetlands.

Private lands are within the County's jurisdiction with the California Department of Fish and Game acting as the Trustee Agency for Biological Resources. State mandated policies and programs include the State Wetland Policy and the California Endangered Species Act. The State wetlands policy mandates that no net loss of wetlands is allowed; for every acre of wetlands impacted new acre must be created. The California Endangered Species Act protects threatened and endangered species and habitats specifically tied to individual animals. Adopted management policies exist for some listed species, such as Swainson's Hawk.

The State of California maintains three (3) large wildlife management areas in Long Valley (Evans Ranch), Antelope Valley, and Smithneck Creek Canyon (Sierra Brooks).



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**SAFETY**

**ELEMENT**



**GENERAL PLAN  
2012**









# SIERRA COUNTY GENERAL P · L · A · N

JULY, 1996

## 14. Safety Element Background Report

### ISSUES

The following issues were raised at the public General Plan Issues Workshops or at other points during the General Plan process by consultants, staff or Planning Commissioners. While each of these issues may not have resulted in the development of a related policy (as a result of Planning Commission discussion) the list is included here as a record of the full range of concerns discussed.

Key issues are discussed in more detail in the Background Discussion section. The following safety issues were raised during the General Plan update process:

**Table 14-1**  
**SIERRA COUNTY SAFETY ISSUES**

**Avalanche hazard and  
road closures**

Avalanche hazard is a genuine concern on associated roadways and the General Plan should address the problem of adverse economic impacts due to closures.

Provision should be made for expedient emergency road repairs.

**Mine pits**

Open mine pits are common hazards and have to be addressed.



<b>Landslides</b>	Landslides should be considered.
<b>Fire hazard</b>	Fire hazard continues to increase due to fuel loading.  CDF may not provide adequate protection.
<b>Children's and bicyclist's safety from traffic</b>	High speed roads are not wanted.  Tourists should go slower.  Bicycles are hazardous on 2-lane roads.

The State General Plan Guidelines (1987) list the following as mandatory issues:

The safety element must cover the following issues to the extent that they pertain to the community:

- The effects of seismically induced surface rupture, ground shaking, ground failure, tsunami, seiche, and dam failure;
- The effects of slope instability leading to mudslides and landslides, subsidence, and other geologic hazards known to the legislative body;
- Mapping of known seismic and other geologic hazards;
- Flooding; and
- Identification and appraisal of evacuation routes, peakload water supply requirements, and minimum road widths as they relate to identified fire and geologic hazards.

Government Code section 8876 also requires the identification of all potentially hazardous buildings for jurisdictions within Seismic Zone 4. Sierra County is within Seismic Zone 3.

## Background Discussion

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### Flooding

The County has numerous streams and rivers, and consequently numerous places of potential flooding. However, large magnitude flooding with potential to affect developed areas occurs primarily in three areas mapped by the Federal Emergency Management Agency (FEMA): 1) Smithneck Creek through Sierra Brooks to Loyalton, 2) Cold Stream Canyon into Sierraville, and 3) the North Yuba River (and Downie River) from Sierra City down to Goodyears Bar (see Figure 14-1, Key Safety Hazards Map). Also note that FEMA mapping is included on the Community Land Use Diagrams where available: See Land Use Element.

Smithneck Creek flooded in 1986 and damaged a City of Loyalton watermain, logs at the Sierra Pacific Industries Mill, and various homes. As a result of that event, the Smithneck Creek Coordinated Resource Management Com



mittee (CRM) was formed and continues to meet (January Mountain Messenger newspaper article titled "Smithneck CRM Back to Work"). The CRM has created a Coordinated Resource Management Plan (CRMP) with FEMA which, at this point (10/92), consists primarily of floodplain mapping (Julie Griffith, Sierra County Planning Department, Personal Communication, 10/92).

Cold Stream also floods and has historically threatened structures in Sierraville, and most of the town is shown in the FEMA 100 year floodplain.

Flooding along the North Yuba has a long history as reported in the publication: *Floodplain Information, North Yuba and Downie Rivers, Downieville, California*, by the U.S. Army Corps of Engineers (COE) January, 1975. Recorded flood events are shown in the table below :



**Table 14-2**  
**HISTORICAL FLOODFLOWS**  
**NORTH YUBA RIVER**

<b>Flood</b>	<b>Flow<sup>1</sup> (c.f.s.)</b>
March 1928	28,000
December 1937	26,000
November 1950	26,400
December 1955	26,800
January-February 1963	40,000
December 1964	37,600

<sup>1</sup> Below Goodyears Bar.

Additional note: Table 5 reports the 100 year event (the "Intermediate Regional Flood") as being 50,000 cfs and the reasonable worst case flood ("Standard Project Flood") as being 66,000 below Goodyears Bar.

The flooding history of both Downieville and Goodyears Bar includes events which have destroyed or damaged numerous homes, commercial buildings, mining operations, bridges and roads, and utilities (COE, 1975). The floodplain mapping in the 1975 COE study shows numerous Downieville and Goodyears Bar structures within the 100-year and reasonable worst case floodplains. The study also describes the status of various flood avoidance, control, and management strategies at the time of publication (pp. 7-9).

## **Dam Failure**

The 1974 California Emergency Services Act (Government Code 8589.5) requires local agencies to prepare dam failure evacuation plans based on inundation mapping and at risk properties. Table 14-3 shows the ten Sierra county dams for which evacuation plans are required:



**Table 14-3**  
**EVACUATION PLAN STATUS FOR**  
**AFFECTED SIERRA COUNTY DAMS**

<b>Dam Name</b>	<b>DWR #</b>	<b>Dam Owner</b>	<b>Evac PIn Date/N</b>	<b>Inund. Map Y/N</b>
Aldabade	291-000	Bill Gadda	N	N
Gardeners Point	9000-238	Forest Service	N	N
Independence Lake	105-006	Sierra Pac Power Comp	N	Y
Jackson Mdws Res.		NID (Nevada County)	N	Y
Little Table Rock	9000-205	Forest Service	N	N
Lower Sardine Lake	1-051	Sierra County	N	N
Packer Lake	9000-231	Forest Service	N	N
Palen Reservoir	290-000	Frederick E Baldestro	N	N
Snag Lake	9000-230	Forest Service	N	N
Stampede Reservoir	9000-192	Bureau of Reclamation	N	Y
Upper Salmon Lake	9000-229	Forest Service	N	N
Webber Lake		Cliff Johnson	N	N

SOURCE: OES Letter to Directors of County and City  
Emergency Services Organization, March 31, 1992

As shown, inundation mapping is available for only three of twelve dams, and no evacuation plans exist for any of the dams. The two inundation maps are represented on the Safety Element Hazards Map (14-2).

While inundation maps and evacuation plans have to be developed for all ten dams, it is important to understand that the affected properties are likely to be sparsely population or uninhabited, which should reduce the complexity of the evacuation procedures developed.

## **Geologic Hazards Including Seismic**

The geology of the Sierra Nevada generally, and of Sierra County specifically, is described in a report written by Vector Engineering for this General Plan (see Appendix). In brief, the northern Sierra is thought to have been formed through collisions involving four major tectonic belts, three of which are manifested in Sierra County:

- Central Belt
- Feather River Peridotite Belt
- Eastern Belt

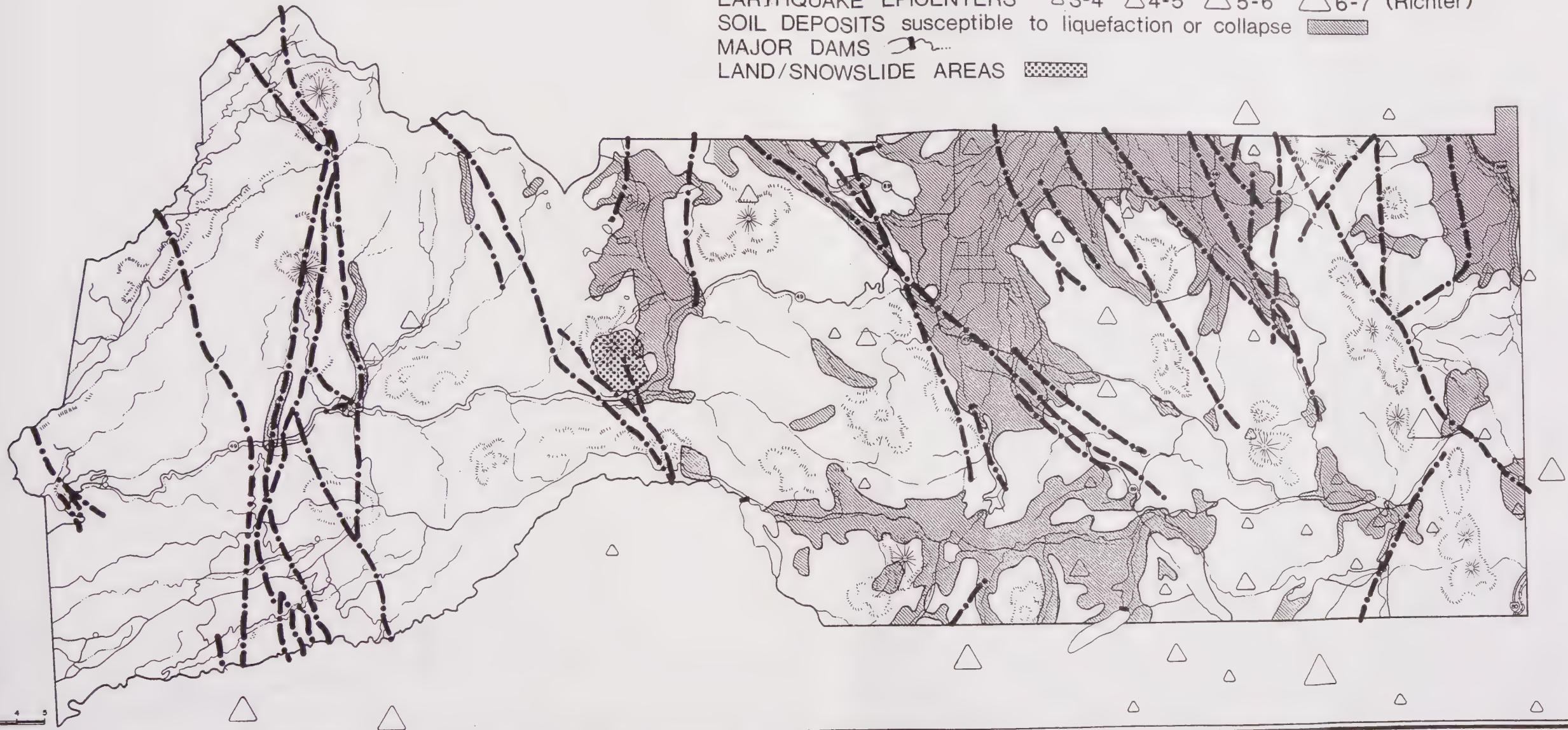
Within Sierra County, the Central Belt lies west of Goodyears Bar and consists of sedimentary rocks, such as slate, sandstone, chert, mudstone, and isolated blocks of limestone (Figure 14-1). Ultramafic and mafic rocks are also present and include serpentine and peridotite.



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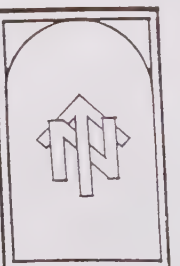


GEOLOGIC FAULTS ———  
 EARTHQUAKE EPICENTERS    △ 3-4    △ 4-5    △ 5-6    △ 6-7 (Richter)  
 SOIL DEPOSITS susceptible to liquefaction or collapse    ■■■  
 MAJOR DAMS    ———  
 LAND/SNOWSLIDE AREAS    ■■■



SIERRA COUNTY  
 CALIFORNIA

Figure 14-1  
 SEISMIC CONSTRAINTS MAP

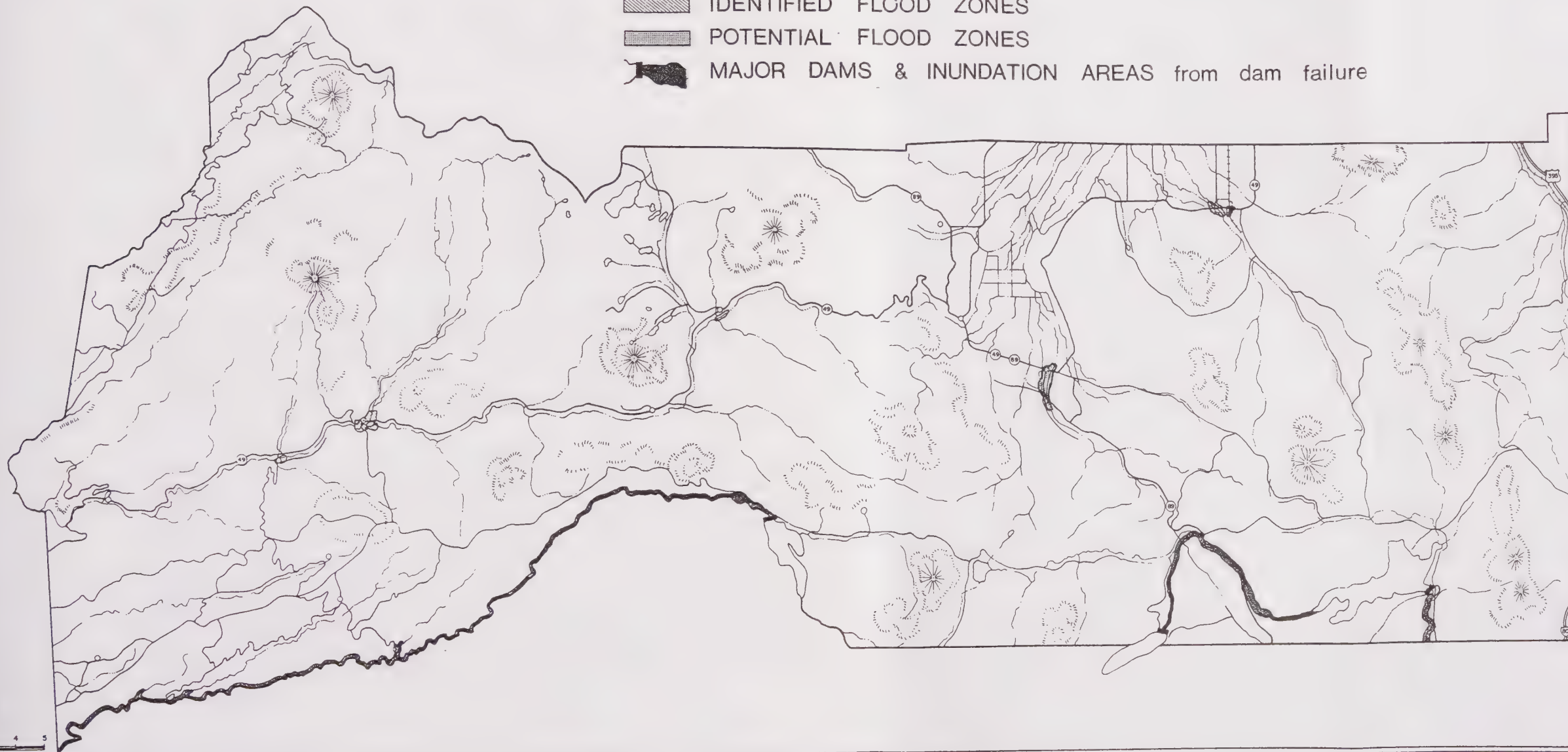








-  IDENTIFIED FLOOD ZONES
-  POTENTIAL FLOOD ZONES
-  MAJOR DAMS & INUNDATION AREAS from dam failure



SIERRA COUNTY  
CALIFORNIA

Figure 14-2  
FLOOD HAZARD CONSTRAINTS MAP









The Feather River Peridotite Belt is one to four miles wide and lies between the Central Belt and Eastern Belt. It contains abundant peridotite, serpentine, and sporadic gabbro and lawsonite-blueschist.

The Eastern Belt consists of older metamorphosed quartz sandstone and associated rock overlain by volcanic complexes.

This geology is complex and contains variable faulting patterns. Detailed studies to delineate active faults have not been widely conducted within Sierra County. The Preliminary Fault Activity Map (Figure 14-5) of California shows several faults within the County, none of which are classified as being within the Alquist Priolo special studies zone.

The faults located in the western portion of the county include the New Melones, Goodyears Creek, Richs Bar, and Dogwood Creek, all of which are within the "Foothills Fault system" and are associated with older deformational events. Well-defined geomorphic evidence of Holocene (11,000 years or younger) displacement along this system is lacking. While short segments of this system have experienced Quaternary (last 2 million years) displacement, none has been mapped within this system in Sierra County.

Late Quaternary displacement has been mapped along the Mohawk Valley Fault located within the central portion of the County, and this fault may be associated with an 1875 earthquake. A well-defined, west-facing scarp one meter high is present in apparently Pleistocene alluvium, but this scarp may be erosional. No faulted alluvial deposits or reported 1875 surface ruptures can be verified.

Historic faulting and surface rupture is associated with the Stampede Valley fault (also known as the Dog Valley fault) which extends from the southeastern portion of Sierra County south into the adjacent Nevada County. Surface ground rupture, slumping and fissuring associated with this fault were experienced in Nevada County in the 1966 Truckee earthquake, estimated to have had a magnitude of 5.7 on the Richter Scale. Displacement along a zone, trending north-northeast about five miles wide and ten miles long, was found in adjacent Nevada County, centered in the Russell Valley area. Based on surface rupture and length, this subsurface northeastward-trending fault is considered capable of generating earthquakes of magnitudes up to 6.5 on the Richter scale.

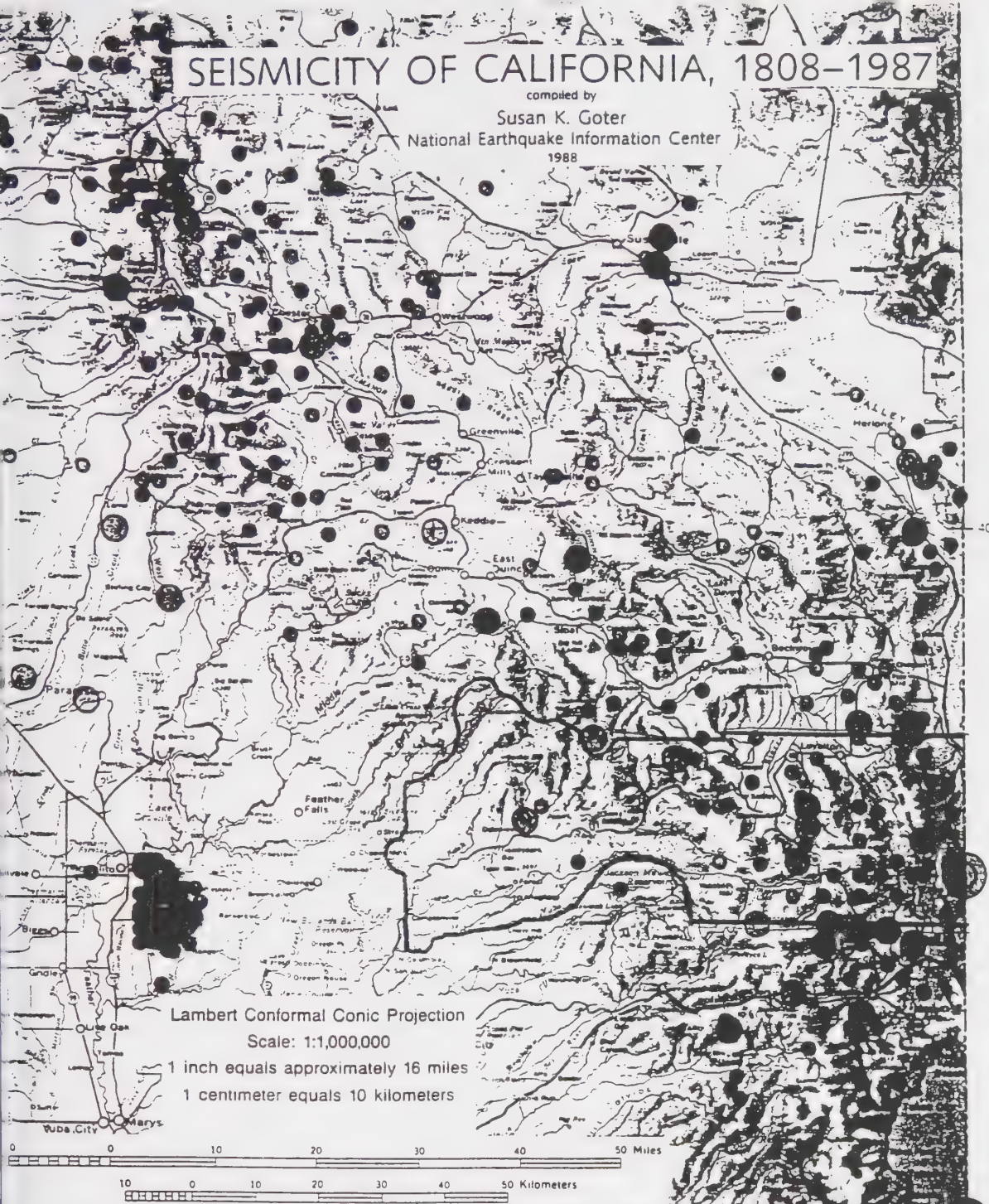


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# SEISMICITY OF CALIFORNIA, 1808-1987

compiled by  
Susan K. Guter  
National Earthquake Information Center  
1988



Lambert Conformal Conic Projection  
Scale: 1:1,000,000  
1 inch equals approximately 16 miles  
1 centimeter equals 10 kilometers



Magnitude			Date
3.0-4.4	4.5-6.4	≥ 6.5	
			1808-1969
			1970-1987

FIGURE 14-3  
SEISMICITY MAP

<b>VECTOR</b> ENGINEERING, INC. 12438 Loma Rica Drive, Suite C, Grass Valley, CA 95945	SEISMICITY MAP	PLATE  <b>3</b>
	SIERRA COUNTY, CALIFORNIA	

JOB NO. 924037.0 APPR. DATE: 9/92



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The following excerpt from the Vector report describes various seismic hazards in the County: *(Note: Specific information on seismicity of Sierra Valley is available in the Department of Water Resources, 1973 publication, "An Interagency-Multidisciplinary Investigation of the Natural Resources of the Sierra Valley Study Area" on pages 28-32.)*

### **Primary Seismic Effects**

Primary seismic effects include ground rupture and surface deformation resulting from differential movement along fault traces. No verified cases of ground surface rupture associated with faulting has been recorded within Sierra County. Surface displacement along the Stampede Valley Fault is considered a potential hazard. Special zoning requirements along this fault trace is recommended due to the potential for surface ground rupture. The extent of offset along this fault trace should be evaluated on site specific basis based on detailed subsurface information analyzed by a certified engineering geologist. Typically, a minimum lateral distance of **at least** 50 feet on either side of an active fault is recommended.

Ground shaking due to earthquakes is a widespread problem throughout California. The seismicity within Sierra County is shown on Plate 3 [Figure 14-6]. Horizontal peak ground accelerations of up to 0.5 g are considered possible adjacent to the Stampede Valley Fault. Effects of ground shaking can be expected to be more severe in areas of unconsolidated alluvium, such a valley floor[s]. Unconsolidated material typically exaggerates the effects of seismic waves, while competent bedrock minimizes these effects.

During the 1966 Truckee Earthquake strong ground shaking was noted within parts of the County. In the town of Loyalton, several stores reported loose objects falling and severe building damage and pipeline rupture was reported in the Loyalton Lumberyard.

### **Secondary Seismic Effects**

Secondary seismic effects from soil responses to ground acceleration. These effects may occur as a result of nearby active earthquakes within and adjacent to the County.

### **Liquefaction**

Liquefaction is the sudden loss of shear strength due to excess pore water pressure buildup resulting from cyclic loading, such as that caused by an earthquake. Typically, liquefaction occurs in loose, saturated cohesionless (little to no binder) sands which densify during earthquake loading. Ground failures generated by liquefaction have been a major cause of damage during past earthquakes. Liquefaction induced ground failures are limited to certain geologic settings and levels of seismic shaking. Factors that affect ground failure susceptibility include sedimentation process, age of deposition, geologic history, depth to groundwater, grain-size distribution, density, depth, ground slope, and proximity of a free face. A qualitative estimate of liquefaction and ground failure susceptibility of various types of sedimentary deposits was developed by Youd and Perkins (1978) is shown in the following table. A preliminary assessment of materials within Sierra county which could undergo liquefaction include recent river channel and floodplain



deposits. The liquefaction potential of a particular site should be based on detailed subsurface information analyzed by a registered engineer or engineering geologist.

### **Slope Stability Hazards**

Due to the remoteness of the county, no published data of slope stability hazards was available. Factors which control slope stability include geologic structure, geometry, geotechnical properties, and location of groundwater. Within bedrock materials, rockfall and undifferentiated landslides typically occur in highly fractured and weathered rock. Slope in which bedrock have dip slopes parallel to the surface are prone to instability. Certain rock types, such as serpentine, are highly susceptible to landslide movement. The stability of soil is highly dependant on it's engineering properties. Typically, loose, unconsolidated soil deposits can be unstable. Oversteepened slopes undercut by differential erosion can present stability problems. Downslope movement of alluvial soils, particularly when saturated exacerbated during seismic events. Human activity (earthwork grading, timber harvesting, etc.) can alter slope stability. The stability of a particular site should be based on detailed subsurface information analyzed by a registered engineer or engineering geologist.



**Table 1**  
[excerpt from Vector Engineering Report]

Type of deposit (1)	General distribution of cohesionless sediments in deposits (2)	Likelihood that Cohesionless Sediments, When Saturated, Would Be Susceptible to Liquefaction (by Age of Deposit)			
		<500 yr (3)	Holocene (4)	Pleistocene (5)	Prepleistocene (6)
(a) Continental Deposits					
River channel	Locally variable	Very high	High	Low	Very low
Flood plain	Locally variable	High	Moderate	Low	Very low
Alluvial fan and plain	Widespread	Moderate	Low	Low	Very low
Marine terraces and plains	Widespread	—	Low	Very low	Very low
Delta and fan-delta	Widespread	High	Moderate	Low	Very low
Lacustrine and playa	Variable	High	Moderate	Low	Very low
Colluvium	Variable	High	Moderate	Low	Very low
Talus	Widespread	Low	Low	Very low	Very low
Dunes	Widespread	High	Moderate	Low	Very low
Loess	Variable	High	High	High	Unknown
Glacial till	Variable	Low	Low	Very low	Very low
Tuff	Rare	Low	Low	Very low	Very low
Tephra	Widespread	High	High	?	?
Residual soils	Rare	Low	Low	Very low	Very low
Sebka	Locally variable	High	Moderate	Low	Very low
(b) Coastal Zone					
Delta	Widespread	Very high	High	Low	Very low
Estuarine	Locally variable	High	Moderate	Low	Very low
Beach					
High wave energy	Widespread	Moderate	Low	Very low	Very low
Low wave energy	Widespread	High	Moderate	Low	Very low
Lagoonal	Locally variable	High	Moderate	Low	Very low
Fore shore	Locally variable	High	Moderate	Low	Very low
(c) Artificial					
Uncompacted fill	Variable	Very high	—	—	—
Compacted fill	Variable	Low	—	—	—

Estimated susceptibility of sedimentary deposits of liquefaction during strong seismic shaking

### Lateral Spreading

Lateral spreading is the phenomenon in which large masses of saturated alluvium flows towards open slopes. This type of soil transport typically occurs along streamcourses. No cases of lateral spreading were recorded in the 1966 Truckee earthquake.



Fire prevention capabilities and peak load water supply characteristics available to local fire protection agencies are addressed in the Public Facilities Element. The County's principal role in fire protection on private lands is to ensure that the CDF State Responsibility Area (SRA) regulations are observed in the approval of land development projects. The SRA regulations specify minimum road widths, required fuel modification around structures, the minimum lengths of dead end streets based on lot size, and other features. CDF may refuse to sign off on building permits if the SRA regulations are not met.

## **Evacuation Routes**

The Circulation Element describes the County's existing road system. The primary paved evacuation routes are the State highways. Most of the County road system consists of narrow, often unpaved roads. Snow is removed from all State highways and about 63 miles of County roads for year-round circulation; the remainder of the road network is considered seasonal. Thus, year-round emergency access is tied to the State highways, Ridge Road, and segments of County roads, such as that part of Smithneck Road serving Sierra Brooks. To date this is not as significant a problem as it might be because of the generally consolidated nature of existing development in the County.

One circulation issue raised during the update process was the environmental impacts of roads in steep areas, particularly when California Department of Forestry (CDF) road design standards are implemented; this issue is addressed in the Circulation Element as are road-related safety issues. (Minimum road widths are also addressed in that Element.)



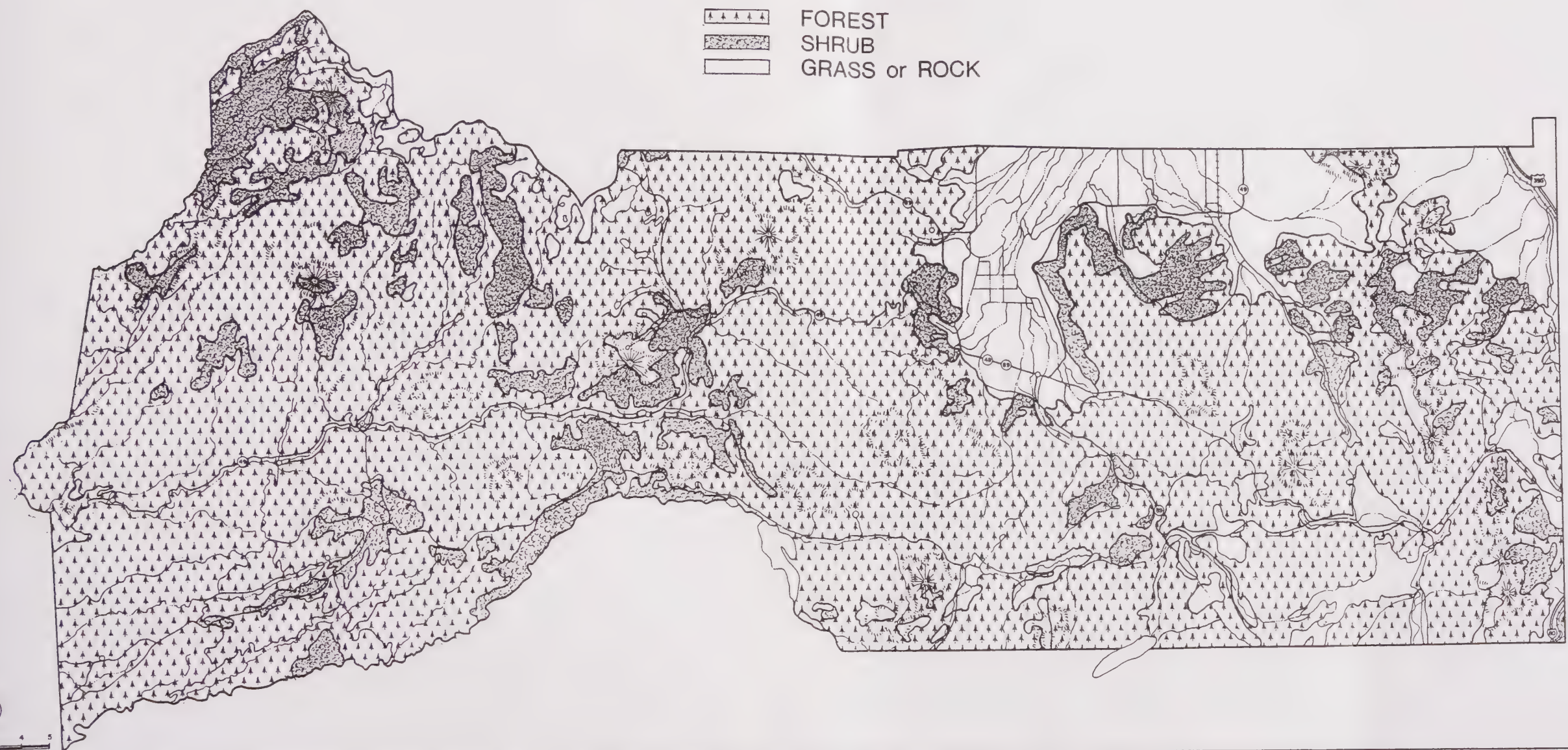


Figure 14-3  
FIRE HAZARD MAP

SIERRA COUNTY  
CALIFORNIA









# ENERGY ELEMENT



GENERAL PLAN  
2012









JULY, 1996

## 15. Energy Element

### Background Report

#### Issues

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The following issues were raised at the public General Plan Issues Workshops or at other points during the General Plan process by consultants, staff or Planning Commissioners. While each of these issues may not have resulted in the development of a related policy (as a result of Planning Commission discussion) the list is included here as a record of the full range of concerns discussed.

Key issues are discussed in more detail in the Background Discussion section. The following energy-related issues were raised during the General Plan Issues Workshops:

**Table 15-1**  
**SIERRA COUNTY GENERAL PLAN**  
**ENERGY RESOURCES ISSUES**

#### **General Plan Issues Workshops**

- |  |   |
|--|---|
| <b>Energy – production impacts</b>     | The use of resource byproducts for energy production has created controversy in the past. Examples include: hydroelectricity, biomass, and geothermal |
| <b>Energy Production Possibilities</b> | Geothermal resources potential needs to be explored.  |



The following additional issues, while not explicitly involving energy, have a close relationship to it:

<b>Housing Rehabilitation</b>	There is a housing rehabilitation need in the County.
<b>Public Facilities and Circulation System Efficiency</b>	Due to the inherent public facilities and circulation system limitations, growth should be consolidated.

The following issues were raised during the technical scoping session on water resources.

<b>Hydroelectric Improvements</b>	The best sites for dams have been taken, but there are still sites available.
<b>Hydroelectric Project Impacts</b>	Some hydroelectricity projects have substantial impacts on riparian resources.

The General Plan Guidelines for the Conservation Element list "water and its hydraulic force" and "minerals" as Mandatory Issues (pp. 117-118). Oil, gas and geothermal resources are considered minerals by the Guidelines.

## Background Discussion

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**California Energy Sources Overview.** Energy is most simply defined as the capacity to do work and it is most commonly measured in British Thermal Units (BTU); one BTU is the amount of energy needed to raise one pound of water one degree Fahrenheit.

The most traditional, and currently the most prevalent, forms of energy supply in California are petroleum fuel, natural gas, and electricity. Petroleum fuel and natural gas are non-renewable sources, meaning that they are gradually depleted with use. Electricity is generated by power plants which can be fueled by non-renewable or renewable energy sources. The primary renewable energy sources are wind, solar, biomass, waste-to-energy, hydroelectric, and geothermal.

Currently, approximately 60% of California's energy sources consist of petroleum, with another 27.6% made up of natural gas and 2.6% coal; thus 90% of its energy sources consist of traditional non-renewable resources (*The 1992-1993 California Energy Plan: The Biennial Energy Report of the California Energy Commission*, p. 23 California Energy Commission (CEC), Publication No. P-106-91-001). Of the State's total energy use, 48% goes toward transportation, which is 100% petroleum fueled (CEC, 1991, p. 26).



in the mid-1970s to 5% today; however, this is projected to change as California and Alaska oil production decline (CEC, 1991, pp. 22-23). Overall petroleum supply and cost continues to be difficult to predict due to worldwide influences. Natural gas use is projected to increase from the traditional 30% to 38% due to its competitive price and clean-burning characteristics.

Sources for electricity production have diversified since the late 1970s when over two-thirds of California's electricity was generated from oil and natural gas. According to the 1992-1993 California Energy Plan (p. 24), California now has the world's most diverse mix of resources for electricity generation. These sources are described in Table 15-2, an excerpt from the Energy Plan (pp. 24-26):

**Table 15-2**  
**EXCERPTS FROM CALIFORNIA ENERGY PLAN**  
**(1992-1993)**

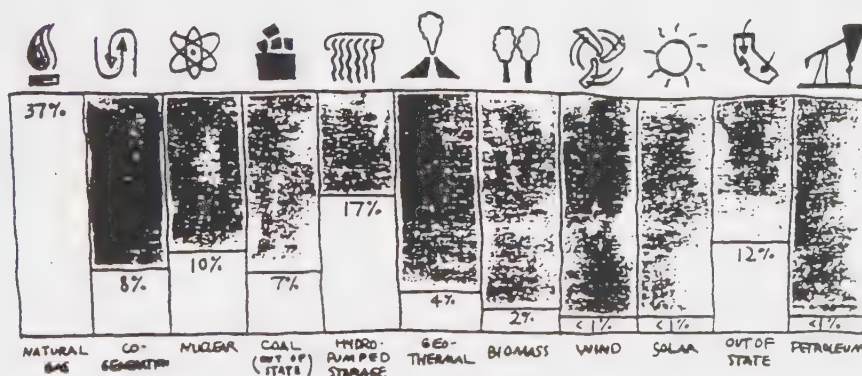
In 1989, 40 percent of California's dependable electricity generating capacity and 52 percent of the actual electrical energy supplied came from nonfossil sources (*Figure 5*).

About four-fifths of the power plants used to meet California's electrical loads are located within the state. Renewable energy resources have become an integral part of this in-state generation. By pursuing new generation technologies, California has 50 percent of the world's geothermal power plants, 82 percent of the world's installed wind-energy capacity, and 99 percent of the world's utility-sized solar generation.

### ELECTRICITY

CALIFORNIA'S ELECTRICITY SYSTEM  
DEPENDABLE CAPACITY 1991

CALIFORNIA LEADS THE  
WORLD IN DIVERSIFIED  
ELECTRICITY GENERATION





**Table 15-3**  
**1992-1993 CALIFORNIA ENERGY PLAN RECOMMENDATIONS AND**  
**SELECTED ACTION STEPS**

Recommendations	Action Steps
<p>1. Increased efficiency should supply most of California's new energy needs because it is usually the least expensive and most environmentally benign option.</p>	<p>1a. The California Public Utilities Commission and the Energy Commission should work with utilities to ensure the development and implementation of cost-effective energy efficiency programs for both electricity and natural gas use.</p> <p>1b. The state should continue to provide technical assistance and grants for identifying and implementing cost-effective, energy-efficient farming practices.</p>
<p>2. California should continue to capture energy savings in new buildings and appliances as cost-effective technology and design improvements occur.</p>	<p>2a. The California Energy Commission will seek cost-effective reductions of energy consumption in new buildings by at least 5 percent every three years. These reductions should be obtained through a combination of improved enforcement, education that includes supporting local efforts to increase compliance with the building standards, and identification of new energy efficiency measures.</p> <p>2b. The California Energy Commission will develop voluntary guidelines or model codes for achieving cost-effective energy efficiency savings which exceed the state standards and reflect local, environmental, or utility system costs for use in utility and local government programs.</p>



**Table 15-3 Cont.**  
**1992-1993 CALIFORNIA ENERGY PLAN RECOMMENDATIONS AND**  
**SELECTED ACTION STEPS**

Recommendations	Action Steps
<p><b>3.</b> California should promote building retrofit programs because existing structures are the largest untapped source of energy efficiency improvement opportunities in the state.</p>	<p>3a. In allocating funds to low-income groups, the California Department of Economic Opportunity should emphasize programs that permanently improve energy efficiency of low-income housing.</p> <p>3b. The state should increase its direct technical and financial assistance to minimize energy use by local governments, schools, and hospitals.</p> <p>3c. The California Energy Commission will develop model ordinances or guidelines for local government use to maximize cost-effective energy-efficient retrofits of existing buildings.</p>
<p><b>4.</b> The state should require the most cost-effective and efficient operation of its existing electricity generation, transmission, and systems to minimize the economic and environmental impacts of existing facilities and new construction.</p>	<p>4a. The California Energy Commission and the Public Utilities Commission should develop transmission policies that recognize the site-specific nature of some renewable resources, thereby enhancing the state's energy resource diversity goal.</p>
<p><b>5.</b> To make more dollars available for public services and set an example for the private sector, state and local governments should increase cost-effective, energy-efficient measures in their operations.</p>	<p>5a. State and local governments should consider cost-effective energy efficiency a high priority when purchasing and leasing vehicles and equipment (such as the California Department of Transportation's Resource Conservation Program).</p> <p>5b. The state should expand its current technical assistance and grants program to local governments to maximize cost-effective efficiency benefits and to integrate energy efficiency into local government policies and planning.</p>



**Table 15-3 Cont.**  
**1992-1993 CALIFORNIA ENERGY PLAN RECOMMENDATIONS AND**  
**SELECTED ACTION STEPS**

Recommendations	Action Steps
<p>6. California should continue to pursue diverse energy supplies and the commercialization of new technologies to improve energy security and environmental quality.</p>	<p>5c. State and local governments should aggressively pursue energy-efficient recycling and integrated waste management goals.</p> <p>5d. The state should consider bond financing to establish a self-sustaining program that assists local governments in meeting capital expenditures for energy efficiency measures with repayment through energy cost savings.</p>
<p>7. California should aggressively work to increase the efficiency of its transportation system and the vehicles that use it; since they consume three-fourths of the oil and half of all the energy used in the state, and are the major source of air pollution in California.</p>	<p>7a. Local governments in California should promote energy savings by requiring cost-effective, energy-efficient integrated transportation and land use planning.</p> <p>7b. State and local governments should give high priority to reducing transportation energy impacts when siting new government buildings.</p>
<p>8. New vehicle, engine, and fuel technologies should be demonstrated and commercialized in California to provide transportation energy security, price competition, and environmental quality.</p>	<p>8a. By 1993, all local agencies should have a plan for converting their fleets to alternative fuel vehicles that meet or exceed California air quality standards and are cost-effective.</p>
<p>9. Transportation Energy Demand Forecasts should be integrated in the next State Energy Plan to assist state and local agencies in reaching solutions to transportation, energy, and environmental problems.</p>	



**Table 15-3 Cont.**  
**1992-1993 CALIFORNIA ENERGY PLAN RECOMMENDATIONS AND  
 SELECTED ACTION STEPS**

Recommendations	Action Steps
<b>10.</b> The state should promote energy education and provide information to help consumers make informed decisions, reduce their energy costs, and capture the benefits of the marketplace.	10a. The state should encourage the use of energy accounting and monitoring services for businesses and local governments to better identify state use and cost reductions.
<b>11.</b> The full costs and benefits of environmental impacts should be included in the economic evaluation of all proposed energy activities to capture the full benefits of the marketplace.	11a. The California Energy Commission and the Public Utilities Commission should determine the most appropriate criteria and methods to ensure that full environmental costs and benefits are considered in all energy facility planning and siting decisions.
<b>12.</b> The market should send accurate signals to consumers by reflecting the true, full costs of energy to promote fair competition in the market.	

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Note: Only those action steps most directly related to local government are shown.

SOURCE: 1992-1993 California Energy Plan



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With increasing demands for electricity projected, the California Energy Commission is fostering continuation of that diversity through a policy which targets up to 50% of new electricity generation for non-fossil fuel technologies (CEC, 1991; p. 29). Job creation and revenue, environmental quality, and energy security are noted as reasons for diversification through non-fossil fuels (CEC, 1991, pp. 53, 51, 59).

In addition to supporting alternative energy sources, the State Energy Plan promotes energy conservation, as a means of stabilizing energy consumption despite projected population growth. Meeting this goal of stabilizing energy consumption will require a 30% reduction in energy consumption by the year 2009 and ". . . an almost immediate market saturation of new energy efficiency technologies as they become available" (CEC 1991, p.49).

The California Energy Plan contains 12 recommendations, each with action steps to implement the states energy policy. The recommendations are listed in Table 15-3 along with those action steps which most directly relate to local agencies. In brief, the most relevant provisions are:

- encouraging land use patterns which reduce transportation energy consumption
- Saving energy in governmental buildings and vehicles.
- transitioning to alternative fuels in governmental vehicles.

### **Local Role in Power Generation**

The increased diversification of electric power generation, noted above, carries with it a reduction in the size of new power generating facilities. The implications for local governmental decision-making are described in the following excerpts from the publication *"Small but Powerful -- a Review Guide to Alternative Energy Projects for California's Local Decision-Makers"* (Association of Bay Area Governments, September, 1987):



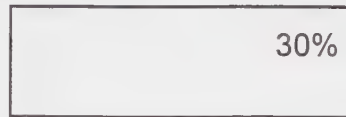
The electrical energy supply system in California is moving toward decentralization —to smaller facilities and localized control. As it does, many more local government officials are faced with siting and permitting decisions on an increasing number of energy developments.

PERCENT OF EXISTING

ENERGY SUPPLY GENERATED

BY POWER PLANTS OF

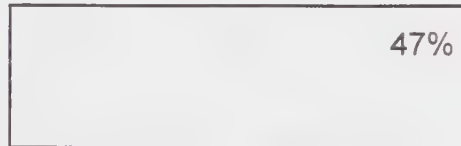
LESS THAN 50 MEGAWATTS



PERCENT OF PROPOSED<sup>1</sup> ENERGY

SUPPLY TO BE GENERATED BY  
POWER

PLNTS OF LESS THAN 50 MEGAWATTS



SOURCE: California Energy Commission, California Power Plant Maps, June 1986

The State's power supply system also is becoming increasingly diversified as cogeneration plants, wind-turbine generators, small hydroelectric facilities (of less than 50 megawatts), biomass and waste-to-energy (WTE) projects, and solar facilities add their power to the electric grid. City and county officials are being asked to permit new energy-related projects in their jurisdictions without clear information on the benefits and impacts on their communities.

Under their local land use permit authority, they are faced with unfamiliar technologies that raise concerns about compatibility with community values for health, safety and appearance.

One or two 50 kilowatt wind turbine generators are a curiosity; 10 or 100 such machines across a ridgetop may be perceived as a less desirable use of local land. The 125 foot flue gas stack necessary for adequate air pollution dispersion from a 10 megawatt cogeneration plant may tower over a small rural community and be perceived as a dramatic change in community appearance. Chip vans or transfer vehicles carrying wood fuel or garbage to a wood-fueled power plant or a resource recovery facility may impact local roadways. These and other impacts will be of concern to citizens and neighbors of the proposed projects.

Small scale energy projects may have community benefits, as well. Construction and maintenance jobs may create local employment opportunities. Lower energy costs for a local industry may increase its viability.

A city or county, especially a smaller one, may receive only a single such proposal. Others, particularly those with high potential energy resources



may be responding to a rash of similar proposals. Three problems in local planning and permitting may hamper local review of these projects.

1. The characteristics of energy facilities may be unfamiliar to local officials.
2. The local impacts of energy facilities may not be known.
3. No local policies or guidelines may exist for siting these facilities or mitigating their impacts.

The ABAG publication defines "Small, Non-traditional Energy Facilities" as those which use renewable fuel resources or use, a non-traditional technology, such as cogeneration. Specific facilities discussed are:

- Wind
- Solar
- Biomass or waste-to-energy
- Hydroelectric, and
- Cogeneration

Those with a generating capacity of less than 50 megawatts (50 million watts) are considered small. Table 15-4 on the following page summarizes the typical advantages and disadvantages of these facilities.

## **Sierra County Energy Use & Generation**

**Overview** Energy is consumed in Sierra county in a number of ways, including:

- Gasoline in motor vehicles
- Propane in heating and appliances
- Wood in heating
- Electricity in lighting, heating, appliances, and machinery,

Gasoline use is tied to the number of miles travelled by vehicles — known succinctly as "Vehicle Miles Travelled", or VMT. VMT increases with more geographically distributed development and decreases with more consolidated development. Other energy uses are more difficult to quantify, such as wood burning and propane use. (The County is not provided with natural gas service.)

Electricity use occurs within three different utility service areas of the County by a total of 2174 customers (commercial and residential) as shown in Table 15-5.



**Table 15-4**  
**SUMMARY OF SMALL ENERGY FACILITIES**  
**Characteristics and Issues**

	Technology for Electricity Prod.	Time Fluctuations	Development Benefits	Development or Access Constraints	Environmental Impact Issues	Major Regulatory Issues
Wind	Wind turbine generators	Daily and seasonally; typically, highest production in summer	Proven source, summer production, negligible air and water quality problems, no water use, quick installation, jobs	May be altered by large upwind structures, cannot be transported	commits land to wind farms and compatible uses (especially grazing), aesthetics, disturbance to wild and domestic animals, bird kills, erosion, noise, broadcast signal interference	Land use and environmental concerns
Biomass/Waste-to-Energy	Direct combustion and cogeneration, directly following gasification and methane fermentation	Some—seasonal; other—constant	Reduces waste disposal costs, seasonal job extension, extends landfill life, avoids or centralizes some environmental impacts	Collection and transportation costs, waste ownership	Harvesting forest residues; collection traffic, pavement wear and noise; air quality, by-product disposal, conflict with objectives of waste reduction and reuse, explosions; in some areas: geotechnical concerns, plants or animals, aesthetics and public acceptance, noise, disease, odors	Air quality regulations
Solar	Photovoltaics (PV); solar thermal (solar power towers, ponds, parabolic troughs and dishes)	Daily and seasonally	Summer production (PV may be higher than solar thermal in spring and fall); minimal environmental impacts; for non-PV — jobs	May be blocked by structures or vegetation, cannot be transported	Aesthetics, removes land for other purposes; some areas; geotechnical concerns, plants or animals; non-PV only: water use, chemical spills	Assurance of solar access and rights



	Technology for Elec- tricity Prod.	Time Fluctuations	Development Benefits	Development or Access Constraints	Environmental Impact Issues	Major Regulatory Issues
Hydro- Electric	Turbine generators	Daily, seasonally and annually	Proven source, some jobs, negli- gible air quality impacts and wa- ter use, opportu- nities for retro- fitting existing dams, canals and pipelines	Water rights agreements	If undeveloped stream or river, impacts on hydrology, water qual- ity, wildlife, fish, cultural resources, scenic and recrea- tional opportunities, erosion, noise and safety; if retrofit, site- specific but probably limited and subject to mitigation	Water rights and environ- mental concerns
Cogener- ation	Use with biomass or fossil fuels for sequen- tial produc- tion of electrical and useful thermal energy	constant (except with some biomass fuels); can be varied to meet need	Proven techno- logy, uses energy which is currently wasted, can be used with variety of fuels, adaptable to existing facilities, flexible	Fuel and transportation costs	Air quality, safety; if biomass or coal fuel- ed, ash disposal; in some areas: geotech- nical concerns, plants or animals, aesthetics and noise	Air quality regula- tions

**Table 15-5  
SIERRA COUNTY  
ELECTRICAL SERVICE AREAS**

Service Area	No. Sierra County Customers	Estimated Annual Electricity <sup>d</sup> Consump- tion (mil. kilowat hrs)
Pacific Gas & Electric	941 <sup>a</sup>	8.8
Plumas Sierra Rural Electric Coop	462 <sup>b</sup>	5.2
Sierra Pacific Power	771 <sup>c</sup>	12.4
<b>Totals</b>	<b>2174</b>	<b>26.4</b>

Notes:

a Tim Braaten, PG&E, Personal Communication, 8/10/92

b Cindy Millingan, Accountant, Plumas Sierra Rural Electric Cooperative, 8/10/92

c Kim Mazeres, Senior Market Research Analyst, Sierra Pacific Power, 8/10/92.

d Based on a 4-year average (1988-91) calculated from data in the *Quarterly Fuel and Energy Report*, by the California Energy Commission, 8/20/92.



The County's electricity producing facilities include a 0.06 megawatt oil/gas fired power plant in Downieville and five hydroelectric power facilities in various locations (these facilities are discussed further in subsequent paragraphs). These facilities are tied to California's and Nevada's power distribution/transmission system via a network of local power lines. In Western Sierra county, the network consists primarily of a 12 kilovolt (kcv) line following the Highway, and branching off at Downieville and Goodyears Bar to connect with a 60 KV line which terminates at Alleghany (see Figure IV-8 of *Environmental Assessment, Hydroelectric Development within the North Yuba River Basin of Sierra County*, Holton Associates, 1989). A separate transmission line was constructed as part of the Lower and Middle Haypress Creeks Hydroelectric Project to deliver electricity south to lines at Bowman Lake. The capacity constraints of the various local power lines, as they relate to existing and then-proposed hydroelectric projects, are described in the above-referenced Environmental Assessment (Holton Associates, 1989, pp. 151-155). In general, the existing network does not have capacity for major new power generating facilities.

The sections which follow discuss the small scale, alternative technologies which appear to be most feasible in Sierra County. The focus of the discussion is on hydroelectricity and geothermal power, but solar, wind, biomass, and cogeneration are also discussed.

**Sierra County's Hydroelectric Power.** The County's existing hydroelectric facilities are described in Table 15-7. Most of the projects are relatively small, run-of-the-river type facilities with generators of 0.02-5 megawatt (mw) capacity generating from 0.277 to 26 million kilowatt-hours per year of electricity.

The County conducted an evaluation of the environmental effects of hydroelectric projects and released the "Environmental Assessment, Hydroelectric Development Within the North Yuba River Basin of Sierra County" (Holton Associates, 1989). The Environmental Assessment focuses on the cumulative effects of the five existing projects plus nine projects that were being proposed at that time. Most of the proposed projects were run-of-the-river type facilities similar in scale to those which exist; the primary exception of this was the then-proposed "Wambo Bar" project.



Wambo Bar was proposed by the Yuba County Water Agency to be a dam 300 feet in height and 750 feet in width creating a reservoir of 665 acres in surface area. The dam was proposed to be in Yuba County, but the reservoir would have inundated land in Sierra County. The second largest project proposed was called the Pauley-Lavezzola. This project included a dam 40 feet high and 700 feet wide, and a reservoir of 50 acres minimum surface area. The effects of these two projects were prominent in the Environmental Assessment (see pages 5-8). The following table lists environmental features impacted by one or both of the projects.

**Table 15-6**  
**ENVIRONMENTAL FEATURES IMPACTED BY THE**  
**WAMBO BAR AND/OR PAULEY-LAVEZZOLA PROJECTS**

- Winter range and outstanding hunting area (WB)
- Bald eagles, golden eagles, ringtail, red-legged frog, and foothill yellow-legged frog (WB)
- Spotted owl habitat (WB+PL)
- Northern goshawk habitat (PL)
- Various riparian and wetland habitats (WB + PL)
- Whitewater rafting opportunities (WB + PL)
- Pacific Crest Trail (PL)
- Migration routes, recreation, visual, and cultural (all projects)

*Note:* WB = Wambo Bar  
 PL = Pauley-Lavezzola

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As indicated in the table, biotic resources were those predicted to sustain the largest number of impacts. The Environmental Assessment contains a number of measures intended to offset the reported impacts (Holton, pp. 159-195). Some of those measures could be clearly effective, such as those related to the routing and design of pipes and channels. Others do not appear to be as feasible or effective; the principal example of this is the requirement for habitat replacement acreage in an amount that "... should in no case be less than the acreage lost." This could prove to be impossible in the case of a reservoir affecting large acreages of one or more habitat types. Riparian habitat, for example, would probably be difficult to replace in Sierra County in quantities over 5-10 acres. Large, irreplaceable losses of important habitat would not be consistent to the basic policies of this General Plan. (See Plants and Wildlife Element).



**Table 15-7**  
**SUMMARY DESCRIPTION OF EXISTING**  
**PRIVATE HYDROELECTRIC PROJECTS IN SIERRA COUNTY**

Name	Applicant	Location	Type of Facility			Trans- mission	Energy Production
			Diversion	Conveyance	Generation		
Wright Ranch	Bertellion	Rock Creek near Goodyears Bar	3-1/2 foot deep overflow type dam	465 ft of 15" CMD 268 ft of wooden flume 2400 ft of earthen ditch 830 ft of 12" penstock	20 (kw) kilowatts	400 ft of overhead line to PG&E line	No estimate available
Salmon Creek	Kenwood Associates	Salmon Creek 3 miles northeast of Sierra City	Rock and earth dam on Upper Sardine Lake + concrete diversion weirs on Sardine and Salmon Creeks near their confluence	5700 feet of 30" penstock	500 kilowatts (kw)*	Direct connection to PG&E lines running above the power house	5.5 million kilowatt hours per year
Haypress-Milton (2 linked projects)	Northwest Power	Haypress Creek about 2 mi east of Sierra City and Milton Creek tributary to Haypress Creek	3 diversions, 2 on Haypress Creek and one on Milton Creek - each approximately 6 feet in height	Approximately 3 miles of pipeline and penstocks	Two powerhouses, each 5 megawatt (mg)	11.5 miles of transmission line south to Bowman Lake	26 million kilowatt hours per year
Charcoal-Ravine	Neocene Exploration	Charcoal Ravine tributary	6 ft high diversion structure	1975 ft of 11" penstock	50 kilowatts (kw)	1500 feet of mostly buried transmission line	0.277 million kilowatt-hours per year
<b>Total Energy Production</b>						<i>(excluding Wright Ranch)</i>	<b>31.777 million kilowatt-hrs/yr</b>

**Notes:**

All information except energy production from: "Environmental Assessment, Hydroelectric Development within the North Yuba River Basin of Sierra County, Holton Associates, February, 1989.

Energy production estimates from: *Draft Environmental Impact Report and Environmental Assessment for the Haypress Hydroelectric Projects*, Wesco, July, 1984.

\* This generator is listed as 500 mw (megawatts) in the Haypress Hydroelectric Projects DEIR and EA (1984). The latter figure is used in this table because it appears to be the correct one based on the estimated energy production.



**Transmission Lines.** As described previously, the existing electrical transmission system in Sierra County does not have capacity for major new power generating facilities. New transmission lines are sometimes the source of controversy — visual impacts are often the greatest source of concern in rural areas, and other considerations, such as the health effects of electromagnetic radiation, come into the discussion in more urban areas. Visual impacts of any large non-transmission line would be a major concern in Sierra County because of the overall sensitivity of the County.

**Sierra County's Geothermal Resources.** Low and Moderate temperature geothermal resources (40°F - 200°F) can successfully be utilized to supply thermal energy for a varieties of uses. Low temperature resources between 40-120°F are often used in conjunction with water-source heat pumps. Temperatures from 70°F up to 250° are considered to be in the direct use range. Direct utilization of geothermal energy means that the heat is used in its original state to warm buildings or to provide heat for industrial or agricultural process.

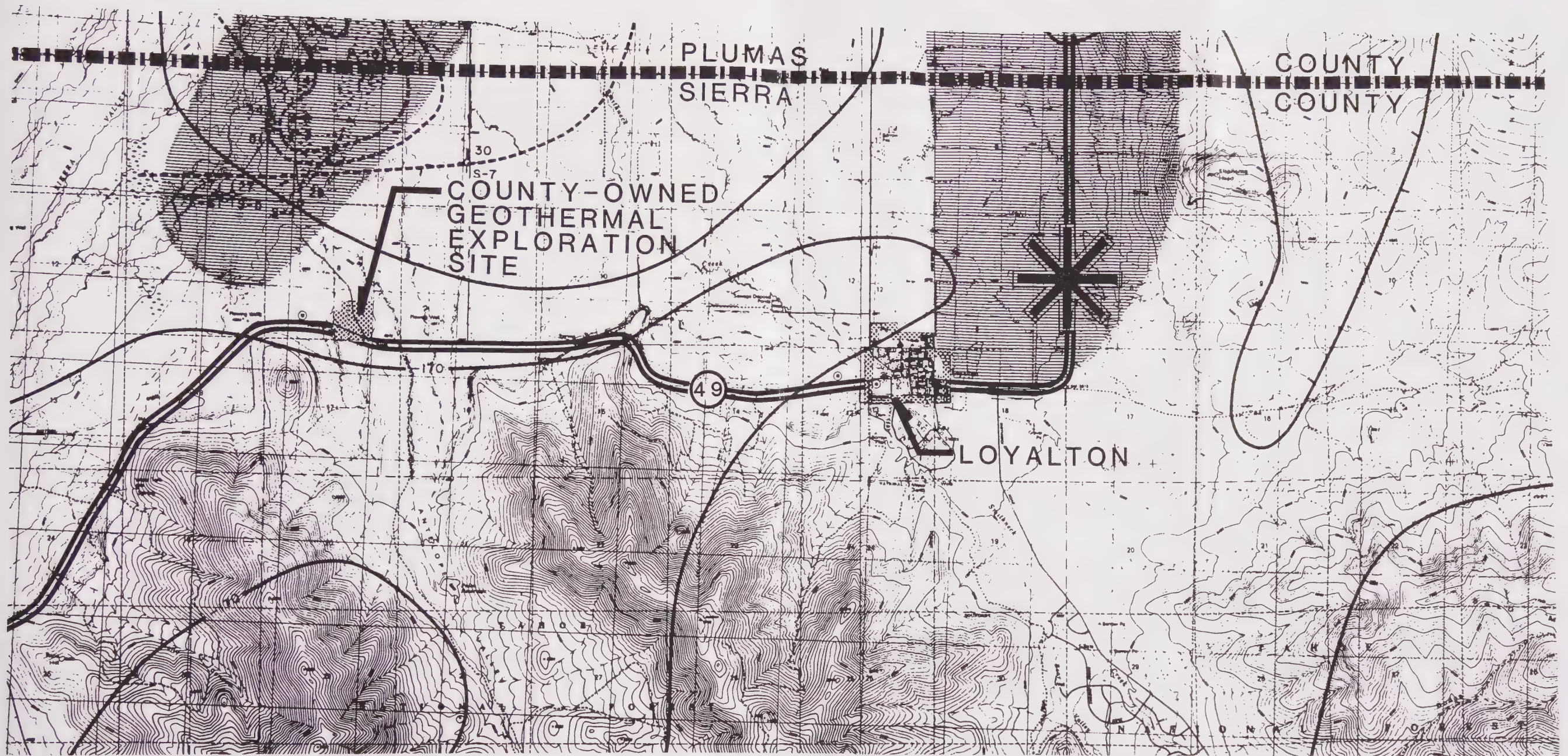
High-temperature geothermal resources are considered to be reservoir systems from which fluids with temperatures of 200°F or greater are produced. These high-temperature resources primarily generate electricity.

Two geothermal resource exploration efforts have been conducted within Sierra County, one commissioned by the City of Santa Clara and another by Sierra County itself. The City of Santa Clara study, performed by SAI Engineers Inc. (November, 1983), identified three areas in and around the City's properties which appear to have potential for geothermal resources (see Figure 15-1). The area nearest Loyalton along the Grizzly Valley Fault (area x) is recommended as the first candidate for further exploration,



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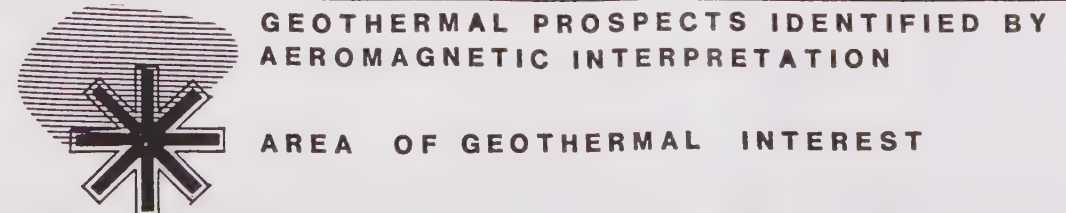
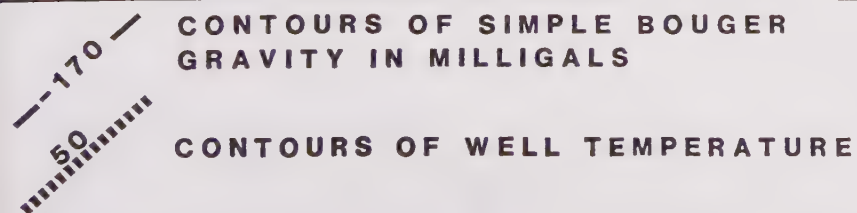




Source: - SAI Engineers, Inc., Nov, 1983,  
Plate 7, and information from the Geothermal  
Investigation for the City of Santa Clara by  
SAI Engineers, Inc.

Figure 15-1  
KNOWN GEOTHERMAL SOURCES

# LEGEND









followed by two locations in Plumas County. Sierra County commissioned GeothermEx Inc. to drill five temperature gradient holes (SV-1 through SV-5 on Figure 15-1) as part of the County's geothermal resource confirmation program (February 1986). This effort found temperatures high enough for commercial applications in two locations along the Hot Springs Fault (SV-1 at 174°F and SV-2 at 169°F). Hole, SV-1 confirmed the presence of geothermal resources in the Filippini Ranch area, which was stated to be part of the hottest thermal area in the Valley and the only source of waters over 140°F within Sierra County at the time of the study. According to the study there is an area of about 200 acres within the County where temperatures exceeding 140°F are likely to be found at 1000 feet or less, with a broader higher temperature zone likely at greater depth (GeothermEx, Inc. 1986, pp. iv-vi). Lower temperature geothermal resources (no hotter than 110°F) are indicated in the Sierraville-Cambell Hot Springs area.

The potential uses of varying temperatures of geothermal resources are shown in Figure 15-2. The types of uses feasible and desirable in Sierra Valley were defined more specifically by the County in the "Sierra County Marketing Final Report" (Lahontan, Inc., July 1985). The following general criteria were used to determine the types of industries to be considered further:

- Compatibility with the Valley's way of life and environment
- Common ties with the existing economic base
- Need for increasing employment opportunities for local residents
- Need by energy-intensive industries for low-cost, reliable, low-to-moderate temperature energy supplies (Lahontan, 1985, p.5)

The selected industries were then evaluated based on the "Generic Industry Priority Criteria" shown in Table 15-8.



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**APPLICATION TEMPERATURE**

°F 50° 100° 150° 200° 250° 300°

Process	Approximate Temperature Range (°F)	Specific Points (°F)
Food Processing	100 - 200	
Cement Drying	280 - 300	
Coal Drying	150 - 250	
Textile Mill	200 - 280	
Furniture	80 - 130	
Lumber	180 - 240	
Pulp and Paper	120 - 280	
Leather	100 - 150	
Rayon/Acetate	150 - 200	
Styrene	250 - 300	
Concrete Block Curing	150 - 200	
Acrylic	220 - 260	
Aggregate Drying	280 - 300	
Pickling	100 - 200	
Cane Sugar Evaporation	250 - 280	
Metal Parts Washing	100 - 180	
Whey Condensing	150 - 220	
Beet Sugar Pulp Drying	240 - 280	
Soil Warming	80 - 120	
Pasteurization	140 - 180	
Scalding	150 - 160	
Carcass Wash and Clean-up	160 - 170	
Milk Evaporation	170 - 180	
Malting	250 - 280	
Distilled Liquor	240 - 280	
Aluming	280 - 290	
Water-culture	80 - 100	
Biogas Processes	100 - 120	
Fruit & Vegetable Drying	150 - 200	
Mushroom Culture	120 - 150	
Bleaching and Cooking	150 - 200	
Rubber Vulcanization	250 - 300	
Beet Sugar Extraction	150 - 200	
Beet Sugar Evaporation	250 - 280	
Soft Drinks	100 - 150	
Pharmaceutical Auto Claving & Clean-up	250 - 280	
Synthetic Rubber	120 - 200	
Organic Chemicals	200 - 300	
Gypsum Drying	280 - 300	
Concrete Block Curing	150 - 200	
Greenhousing	100 - 200	
Kaolin Drying	220 - 250	

°F 50° 100° 150° 200° 250° 300°

15 - 23



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**Table 15-8**  
**GENERIC INDUSTRY PRIORITY CRITERIA**

The following criteria were used to prioritize generic industries:

- Geothermal compatibility - determination of the degree of fit between the energy needs of the industry and the known geothermal resources of Sierra Valley.
- Economics - overall, national or regional, economic health of the industry. Industries should be assessed relative to each other in terms of rate of growth, extent and stability of their markets.
- Energy sensitivity - the impact on business operations and product costs due to energy costs.
- Historic and current use - the past and present use of geothermal direct heat in a given industry can affect its future use by the industry.
- Branch plants - the potential and willingness of a business to establish branch facilities at a geothermal site. A branch facility is considerably easier than the establishment of a new business at a geothermal site. Economic inducements and public funding for such are also restricted to development of branch plants or entirely new businesses, rather than inducing the move of an established business.
- Economic development factors - the following factors are used to rate the interface between the Sierra Valley region and the industries to be rated. These factors in many circumstances are a reflection of the individual industries and businesses needs as well as to what Sierra Valley can offer under those factors discussed below.
  - \* Labor base - absolute labor base (how many workers can be realistically acquired at the local level). This factor can be very critical in the more labor-intensive industries. Additionally, what is the perceived work ethic of the labor base; i.e., would a chronically or seasonally unemployed logger work in a greenhouse?
  - \* Transportation - adequate transportation in terms of all-weather truck routes, air freight terminals within 100 miles, and rail services (to a lesser extent). (Lahontan, 1985, pp. 12-13)
  - \* Community services - availability of housing, public services (police and fire protection), utilities service (water, non-geothermal energy) versus the needs of the generic industries for such services.
  - \* Raw materials - availability of local resources needed by the individual industries. These may include cattle feed crops, consumptive water, solar insolation (sunlight for greenhouses) and other resources specific to an industry.
  - \* Heat load - the application must be of sufficient heat load to warrant the development of the geothermal resource. The heat load requirement per application could be less if more than one application uses the resource, either by cascading or sharing the resource.



- \* Utility rates - local non-geothermal energy costs (and availability) must be reasonable. This would include costs of water and sewage disposal. Additionally, the cost of using the geothermal fluids must be reasonable. If sold under a utility scheme, the cost of geothermal fluids must be low enough to significantly encounter the costs of establishing and operating an application in Sierra Valley, in order to be attractive and competitive with other geothermal areas.
  - \* Land costs and availability - land must be available for sale and costs must be reasonable for most industrial sectors. In some, it can be a critical factor. Certain industries historically require owning fee land.
  - \* Business climate - general Sierra Valley community attitude toward economic development and its specific industries locating in Sierra Valley.
  - \* Living conditions - how critical is the Valley's way of life to a generic industry. It must be remembered that there is a need for skilled management in the listed generic industries, which probably will be imported from outside the Valley.
- Environmental impacts — assessment of the potential impacts from a given industry on the Sierra Valley environment (i.e., aesthetics, water quality, land use compatibility, etc.).
  - Fresh groundwater use — assessment of a given industry's fresh water needs and its potential effect on Sierra Valley groundwater supply. Water quality standards specific to the industry must be met.

The results of the rating system are shown in Table 15-9.

**Table 15-9**  
**INDUSTRY PRIORITY LIST**

Ranking	Application	Score	Relative %
1	Horticulture products (greenhouses)	86	86%
2	Vegetable products	77	73%
3(tie)	Fruit and vegetable processing (dehydration)	74	70%
4	Confined livestock raising	66.5	63%
5	Furniture and wood products	66	63%
6	Aquaculture	62	59%
7	Dairy-related products	61.5	59%
8	Livestock feed processing	56	53%
9	Meat products	53.5	51%
10	Dairy operations (milk)	51.5	49%
11	Sawmills	44	42%

SOURCE: Lahontan, Inc. 1985, p. 15a

The County also performed a direct mailing to solicit interest in Sierra Valley, with its geothermal potential, as a location for enterprises. Positive responses were received from thirteen businesses, including two aquaculture firms and eleven greenhouse operations (Lahontan, Inc. p. 20, 1985).



Additional marketing efforts have been recommended (Lahontan, Inc. 1985, p. 31). One potential constraint is the quantity and quality of water, particularly in regard to greenhouses (Lahontan, Inc. 1985, p. 24).

The development and utilization of geothermal resources can have adverse environmental effects, including:

- Land use compatibility conflicts if geothermal energy producing facilities or linked industrial uses are located near residential areas, schools, parks, or sensitive land uses.
- Water consumption
- Thermal water quality degradation if warmer waters are discharged to surface waters
- Subsidence if large volumes of groundwater are removed
- Induced seismicity from changes in groundwater characteristics
- Noise, water quality, and air quality degradation from geothermal powered industries
- Other impacts normally associated with urban development, such as effects on native plants and wildlife, on cultural resources, on visual resources, and other features

Within Sierra County, these impacts would probably be limited to some extent by the low temperature nature of the resource, and by the relatively small-scale nature of the users anticipated.

**Sierra County's Solar Energy Resources.** There are two primary means of utilizing solar energy: solar heating of buildings and commercial power generation. Buildings can be heated through passive, or non-mechanical means or through active, or mechanical means. Passive systems can employ building orientation, use of eaves and deciduous vegetation, and thermal masses. Active systems can involve photovoltaics or roofplate collector systems.

Commercial power generation typically consists of either photovoltaics or solar-thermal facilities. The latter type uses solar radiation to heat a liquid to gas which drives a steam turbine connected to an electrical generator. Large tracks of open, unshaded land is needed in areas that receive substantial



sunlight. Five to 24-acres of land are required per megawatt of electrical capacity depending on the type of facility (*Glenn County Energy Element*, May 11, 1992 Draft).

The most likely utilization of solar energy in Sierra County for the term of this General Plan is likely to be in heating of buildings. While commercial solar generation may be technically feasible in the County, most likely in Sierra Valley, it does not seem likely that major facilities would be proposed due to the area's remoteness from the main power grid, complications related to weather, and, in the case of solar-thermal, lack of abundant water supplies. It is always possible, however, for technological improvements to alter the potential for commercial solar facilities.

Solar heating of buildings may also increase in feasibility with innovation; at some point it may become more affordable for photovoltaics to provide homes with electricity (a photovoltaic system for a single-family home is currently estimated to cost about \$20,000 without air conditioning — Ewan, 1991 as cited in the Draft Glenn County Energy Element"). However, large amounts of energy can be saved from the currently common solar uses such as passive solar and roof-top collectors.



**Sierra County's Wind Energy Potential.** The map following (Figure 15-3) shows mean annual wind power potential. As shown, there are six areas of excellent potential shown in Sierra County: four around the crest of the Sierra range, one on Sardine Peak, and one on the Verdi Range.

The City of Santa Clara investigated wind potential at its property north of the Bald Mountain Range but no wind energy proposal has been put forth.





WIND SPEED

-  11 to 14 MPH Good
-  Above 14 MPH Excellent

SCALE IN MILES

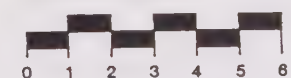


Figure 15-3

## POTENTIAL WIND ENERGY AREAS

SOURCE: California Energy Commission "Wind Atlas" April 1985







**Sierra County Biomass and Cogeneration Energy Potential.** Biomass energy results from the combustion of various organic waste products, typically from agricultural or industrial processes; biomass can be used to reduce the amount of waste directed to landfills in what is often referred to as waste-to-energy facilities.

In Sierra County, the only application of biomass technology is the burning of timber byproducts at the Loyaltan Mill and the conversion of electricity to serve the mill complex and supply additional power to SPPCo.

## Related Plans

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The California Energy Plan is described in the Background section — in terms of local governments, it primarily entails advisory recommendations and educational steps aimed at energy-efficiency.

The Tahoe National Forest Land and Resource Management Plan (TNF, 1990) has the following statements regarding energy use on the Forest:

### **ENERGY CONSERVATION**

1. **Current Management Direction.** The efficient use of energy is part of the criteria used for existing management practices on the TNF. The TNF does not actively solicit development of the various energy minerals or resources.
2. **Supply or Production Capacity.** Energy consumption is classed into two types, (1) direct consumption of energy by TNF administration and (2) indirect consumption by TNF users, permittees, and contractors. Direct consumption is by vehicle fuel, building utilities, and management practices. The amount of fuel used varies by vehicle type. Fuel use has stabilized in recent years as more economy vehicles are used and travel is reduced. Most administrative buildings are over twenty years old . . . and are not as energy efficient as they could be. Retrofitting buildings and other measures are currently occurring. Indirect consumption cannot be controlled by the TNF other than by transportation systems design and seasonal recreation use restrictions.

The TNF Plan then has the following goal and Desire Future Condition:

### **ECONOMIC AND ENVIRONMENTAL EFFICIENCY**

1. Provide energy-efficient land management practices where practical.

#### **Desired Future Condition**

**Forest Service management programs will be conducted using the least-cost method of meeting the goals and objectives of the Plan.**



Specific management direction calls for the following steps (p. V-19)

- The use of all forms of energy conservation as appropriate,
- The encouragement of mass transportation in areas of heavily used public recreation,
- The use of review procedures for wind energy sites,
- The restriction of wind forms from various sensitive areas, including "Special Interest Areas", "Research Natural Areas", all scenic areas, and other,
- The retrofit of all building and facilities for which energy surveys indicate a favorable "Savings Investment Ratio".



**VISUAL**

**ELEMENT**



**GENERAL PLAN  
2012**









JULY, 1996

## 16. Visual Resources Element

### Background Discussion

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The scenic quality of Sierra County is defined by its natural scenery as well as its historic communities and the activities of a rural economy. The built environment is generally discussed in the Cultural Resources Element. Natural scenic features of particular importance are mapped on Figure 16-1.

#### **Scenic Roads and Highways**

Views from the County's more heavily travelled routes as well as those which pass through recreational areas or visually unique or highly scenic areas are of particular importance to protect. These areas are both an economic resource for the tourism sector of the economy and a resource to existing residents as one of the key components of the County's rural quality of life. Scenic roads and their status as well as recommended status are listed below in Table 16-1.



**Table 16-1  
SIERRA COUNTY SCENIC ROADS**

Road	Status	Recommendations
Highway 49 – Yuba County line to Yuba Pass Summit	Official State Scenic Corridor Highway (towns are excluded) Included in the USFS Scenic Byway	Though this designation takes in the area from ridge-to-ridge, State and USFS timber harvest regulations are not consistent with the need for retention of views in this area. Development of CDF Special Rules for Sierra County are recommended in the Timber Management Element which would address this issue. Tahoe National Forest revision of Visual Quality Objectives for this area would also be appropriate. County land use designations on private lands should reflect the desire to retain existing views in this area. A Scenic Corridor Overlay should be applied to call for design and site plan review and grading restrictions in this corridor.
Highway 49 – Yuba Summit to Plumas County Line (communities excluded)	Yuba Pass Summit Candidate State Scenic Highway, Existing County Scenic Highway, portions incorporated into the USFS Scenic Byway	The County needs to adopt design standards for this route and apply to the State to receive official State Scenic Highway designation. The designation could bring additional recognition on State mapping to this route. Scenic resources include Sierra Valley views. Low density land use designations, design review, site plan review, and grading/tree removal restrictions would assist in preserving the scenic quality of this corridor.



Road	Status	Recommendations
Highway 89, entire length excepting communities	State Scenic Highway, Existing County Scenic Highway; included in the USFS Scenic Byway	The County needs to adopt design standards for this route and apply for the State to receive official State Scenic Highway designation. The designation would bring additional recognition on State mapping to this route. Scenic resources include Sierra Valley views and the Little Truckee River corridor. Low density land use designations, design review, site plan review, and grading/tree removal restrictions would assist in preservation of the scenic quality of this corridor.
Highway 395 - State Line to County Line	State Route - No Scenic Protection	The County needs to adopt design standards for this route and apply for the State to receive official State Scenic Highway designation.
Gold Lake Road	Existing County Scenic Highway	This road travels through one of Sierra County's most important recreational areas – the Lakes Basin. Retention of the visual quality of this corridor is critical. The area is heavily used; careful attention to signage, setbacks, and design will lower the perception of high use and ensure retention of the visual character of the Basin. Structures should not be visible from Gold Lake Road except in the Bassetts' Community Area and Community Influence Area. Signage should be limited to small wooden directional signs consistent in theme to provide park-like appearance. Design review, site plan review, low density land use designations, and grading/tree removal restrictions would assist in preserving the scenic quality of this corridor. The Recreation Plan called for in the Parks and Recreation Element will also assist in preserving the visual aspects of this corridor.



Road	Status	Recommendations
Hennes Pass Road	Candidate County Scenic Highway	Expansive high country Sierra vistas and views of Jackson Meadows Reservoir, Milton Reservoir, Sierra Buttes, Webber Lake, and Stampede Reservoir are found on this route. Its rugged, backcountry nature is a valued travel experience to residents and visitors. Low density land use designations, minimal road improvements, design review, site plan review, and grading/tree removal restrictions would assist in preserving the rugged scenic quality of this corridor. Roads should remain dirt and gravel.
Smithneck Road	Candidate County Scenic Highway	The ruggedness of this road ensures a sense of separation between the Valley and Verdi areas. Low density land use designations, minimal road improvements, design review, site plan review, and grading/tree removal restrictions would assist in preserving the rugged scenic quality of this corridor. This road should remain dirt/gravel.
Mountain House Road	No Special Status Proposed County Scenic Road	This winding, rural road is an entry to Hennes Pass Road and the historic community of Forest. Low density land use designations, minimal road improvements, design review, site plan review, and grading/tree removal restrictions would assist in preserving the rugged scenic quality of this corridor. This road should remain dirt/gravel.



Road	Status	Recommendations
Pliocene Ridge Road	No Special Status Proposed County Scenic Road	This rural highway is the entry corridor to the Pike and Alleghany communities and its undeveloped, unspoiled views provide an added sense of remoteness to these two communities. Low density land use designations, minimal road improvements, design review, site plan review, and grading/tree removal restrictions would assist in preserving the rugged scenic quality of this corridor.



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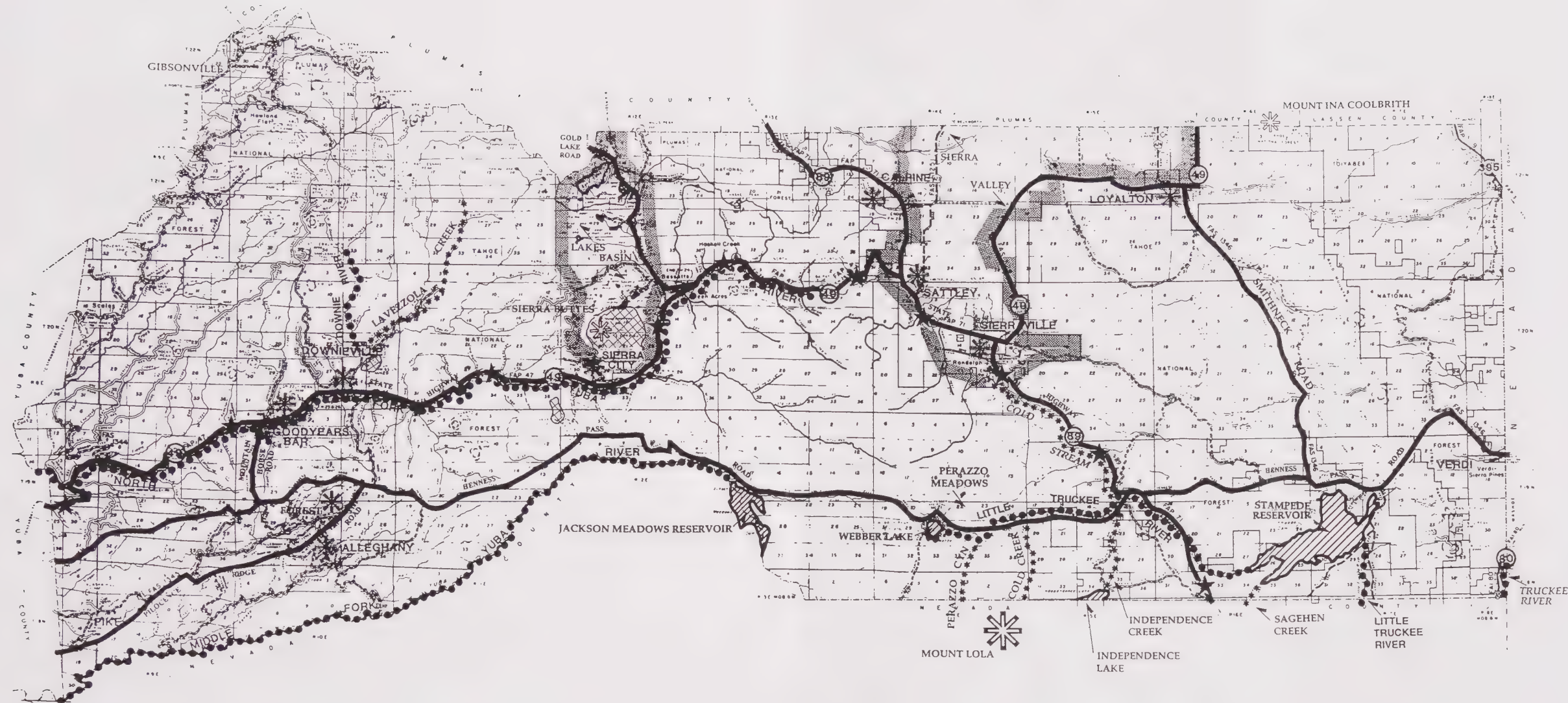
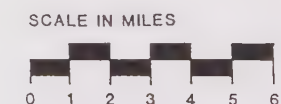


FIGURE 16-1  
SIERRA COUNTY CRITICAL VIEWS MAP



### IMPORTANT SCENIC FEATURES

#### SCENIC ROADS AND HIGHWAYS

- INTERSTATE 80
- STATE HIGHWAY 49
- STATE HIGHWAY 89
- SMITHNECK ROAD
- HENNESS PASS ROAD
- PLIOCENE RIDGE ROAD
- MOUNTAIN HOUSE ROAD
- GOLD LAKE ROAD
- USFS SCENIC BYWAY (DONNER / YUBA BYWAY)



#### LIVING HISTORIC COMMUNITIES

- FOREST
- ALLEGHANY
- DOWNIEVILLE
- CALPINE
- SATTLEY
- LOYALTON
- SIERRA CITY
- SIERRAVILLE
- ASSETTS



#### LAKES AND RESERVOIRS



#### NATURAL LANDMARKS



#### UNIQUE AREAS OF HIGH SCENIC VALUE

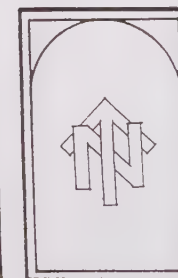
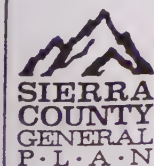
#### MAJOR SCENIC RIVERS

#### MAJOR SCENIC STREAMS

NOTE: ALL OF THE COUNTY STREAMS, LAKES, AND HISTORIC STRUCTURES ARE CONSIDERED UNIQUE VISUAL FEATURES.



#### LAND/ SNOWSLIDE AREA









The rural, mountain setting and open Sierra Valley as a whole create the visual nature of the County. To preserve this essential aspect of the County the cornerstone of this plan is the goal of building on existing communities and to avoid sprawl by retaining large parcel sizes. The intent is to ensure the continued viability of resource production including agriculture, mining, and timber harvesting which further protect visually pleasing open space. In addition, there are numerous individual scenic features or areas of the County which deserve protection. These areas are listed in Table 16-2.

**Visual Impact Concerns** ~ Human activity can result in visual impacts in any number of ways. Potential impact issues of most concern to Sierra County are described below. However, in general, the rural visual quality of the County is of great value to County residents; this feeling was expressed throughout the General Plan workshops.

## **The Built Environment**

Construction activities can result in visually obtrusive grading scars, tree loss, and structures not in keeping with surroundings. Certain aspects of the built environment such as signage and night lighting can be particularly obtrusive in a rural setting. Other concerns expressed during the General Plan workshops included the location of microwave towers and cloud seeding towers, power transmission lines and utility lines in general. The visual clutter that these improvements can create are of concern particularly within the viewshed of scenic corridors.

Road improvements can impact the aesthetics of the roadway. State highway standards, CDF road standards, and even local road standards are often counter to aesthetic goals. The Circulation Element creates standards for certain county roads of particular concern. County input is also needed when State Highway projects are proposed — this issue is also discussed further in the Circulation Element. Relative to CDF Fire-Safe road standards, avoidance of development in outlying areas which will require use of CDF standards is the only option to avoid visually obtrusive roadways.

The built environment can also help define the rural quality of Sierra County. Examples include the County's historic communities, the barns in Sierra Valley, and even structural remnants throughout the county which are reminders of a time past.



**Table 16-2**  
**SIERRA COUNTY SCENIC FEATURES DESERVING PROTECTION**

Scenic Features/Areas	Discussion
<p>Sierra Crest</p> <p>Lakes: Independence Lake Webber Lake Jackson Mdws Reservoir Stampede Reservoir Deadman Lake Coburn Lake</p>	<p>The County's lakes are each visually unique and of particular economic value in their unspoiled state because of their high visitor use. Of particular concern are protection of lakeshores and visual access to the labor, and protection of the viewshed and ridgelines surrounding each lake to ensure an unspoiled mountain lake setting.</p>
<p>Living Historic Communities</p>	<p>The County's historic communities are discussed in the Cultural Resources Element but are also a key visual asset.</p>
<p>Sierra Valley and Sierra Valley barns</p>	<p>Protection of the open nature and traditional activities in the Sierra Valley is important visually as well as to the County's agricultural economy.</p>
<p>Sierra Buttes</p>	<p>The Sierra Buttes are the County's most recognizable calling card. Their visual value is in part related to their unspoiled slopes and foreground. Any visually apparent man made feature would disturb their value.</p>
<p>Mountain Meadows including Perazzo Meadow and Dog Valley</p>	<p>The County's mountain meadows are visually unique destination points. Any disturbance of their open nature would disrupt their visual value.</p>
<p>Rivers and Streams, including the North and Middle Forks of the Yuba River, the Downie River, the Little Truckee River, and the Truckee River</p>	<p>The County's rivers and streams are key visual assets. Protection of visual access and streamside vegetation are critical.</p> <p>The Forest Service is currently conducting Wild and Scenic River eligibility studies for the North Fork of the Yuba River, the Little Truckee River, Perazzo Canyon, and Independence Creek, Sagehen Creek, Cold Creek, and the Truckee River. All would qualify for Recreation/ Scenic status. None would qualify for wild status. (See Water Resources Element for additional discussion of the Wild and Scenic River process.)</p>
<p>Lakes Basin- Gold Lake Sardine Lake Salmon Lake</p>	<p>This visually unique area is one of the most heavily used areas in the County. The remote visual appearance of the area is important to its value but will be difficult to retain because of the high use it experiences.</p>



## Resource Extraction

Mining projects can result in earth disturbance during exploration and development phases which can be highly visible and out of character with surrounding views. This issue is discussed in the Mineral Management Element. Timber harvests can also cause visible scarring as a result of road construction and harvest activities. From a distance, extensive thinning (over 30%) can be visually obtrusive in areas of high viewer concern such as surrounding existing communities and in the viewsheds of scenic corridors. Close-in views of most timber harvest operations in these same areas, can also be obtrusive in the short-term because of the visibility of understory disturbance and slash operations. The Timber Management Element includes additional discussion of these issues as well as related policies.

## Related Plans

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The State of California Scenic Highway system includes one official State Scenic Highway (Highway 49 from the Yuba County line to the Yuba Pass summit) ridge-to-ridge and two candidate Scenic Highways – Highway 89 and the remainder of Highway 49 in the County.

The State Scenic Highway process involves State declaration of candidate highways. At a county's request, Caltrans then prepares special studies to determine the unique characteristics of the corridor. To achieve official Scenic Highway status, the County must adopt design guidelines intended to protect the character of the corridor. The official designation brings location on State Scenic Highway maps and route signage which are important visitor drawing cards.

**National Forest Plans** ~ The three National Forests within the County (Toiyabe, Plumas, and Tahoe) include visual protection policies and other actions which relate to treatment of scenic resources. Each of the plans includes Forest-wide objectives for visual quality as well as objectives for individual management units. The management units within Sierra County are mapped in the Figure 16-2. The Forest Plans also map Visual Quality Objectives (see Figures 16-2 through Figure 16-4) in the following categories:



**Preservation (P)** Only ecological change is allowed

**Retention (R):** People's activities are not to be evident to the casual forest visitor.

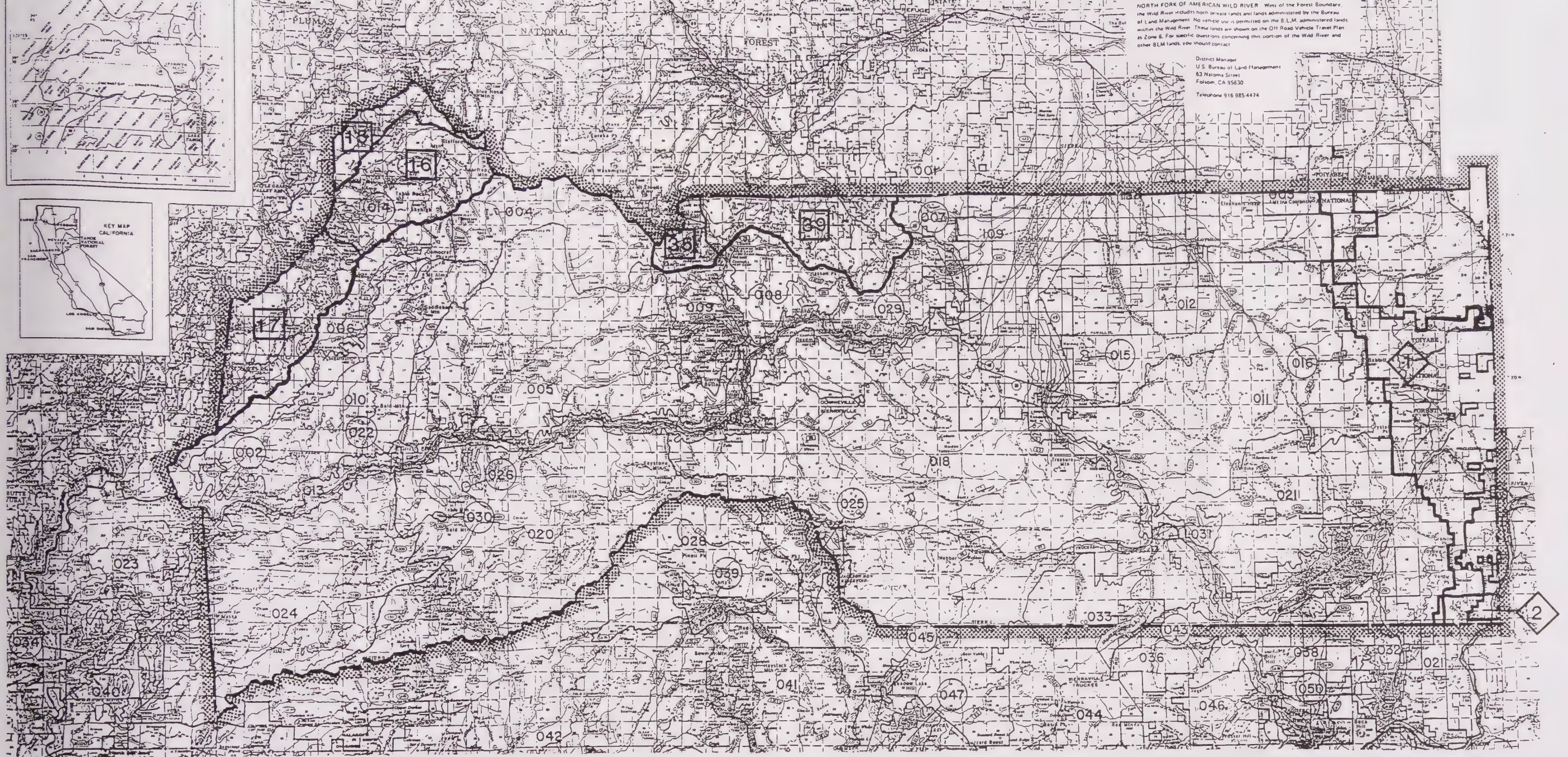
Partial Retention (PR): People's activities may be evident but must remain subordinate to the characteristic landscape.

**Modification (M):** Activities may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. Activities should appear as a natural occurrence when viewed in the foreground or middleground.

**Maximum Modification (MM):** Activities may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background. (Toiyabe National Forest Plan, p. k-2)

Most Forest areas on the Sierra County Critical Views Map are in the Retention category (the North Fork Yuba River corridor and the Lakes Basin, Jackson Meadows). However, the Forest objectives and County objectives may conflict along Henness Pass Road, Webber Lake, Lavezzola Creek, and the North Fork Yuba River Basin where Partial Retention and Modification are allowed. This is a particular concern in the North Fork Yuba River Basin where the ridge-to-ridge area is defined as the State Scenic Highway Corridor and a more restrictive combination of Retention and Partial Retention goal might be appropriate.





Source: Tahoe National Forest Land & Resource Management Plan

## NATIONAL FOREST MANAGEMENT AREAS WITHIN SIERRA COUNTY

FIGURE 16-2

### Tahoe National Forest

Symbol Number & Name of Management Area



001 Carman	008 Chapman	015 Harding	023 Pendola	032 Stampede-Boca
002 Ida	009 Lakes Basin	016 Babbitt	024 Oregon	033 Lola
003 Coolbrith	010 Cal Ida	018 Henness	025 Milton-Jackson	036 Sagehen Basin
004 Sunnyside	011 Smithneck	019 Eight-Nine	026 Galloway	038 Billy
005 Lavezzola	012 Antelope	020 Cornish	029 Pass	044 Castle
006 Canyon	013 Forty-Niner	021 Sardine-Worn	030 Ruby	109 Berry
007 Calpine	014 Devils Postpile	022 Goodyears	031 Kyburz	

### Plumas National Forest

Symbol Number & Name of Management Area



15 Little Grass
16 Bear Trap
17 Poverty
35 Lakes Basin
39 Haskell

### Toiyabe National Forest

Symbol Number & Name of Management Area



1 Dog Valley
2 Carson Front



SIERRA  
COUNTY  
GENERAL  
P.L.A.N









Source: Tahoe National Forest Land & Resource Management Plan.



# LEGEND - VISUAL QUALITY OBJECTIVE

TAHOE N.F.



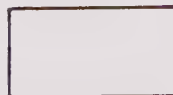
Preservation



Partial Retention



Retention



Modification

FIGURE 16-3

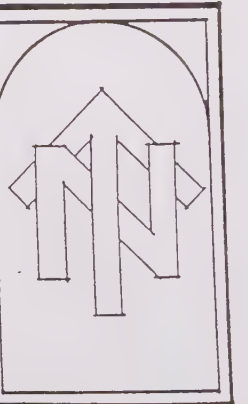
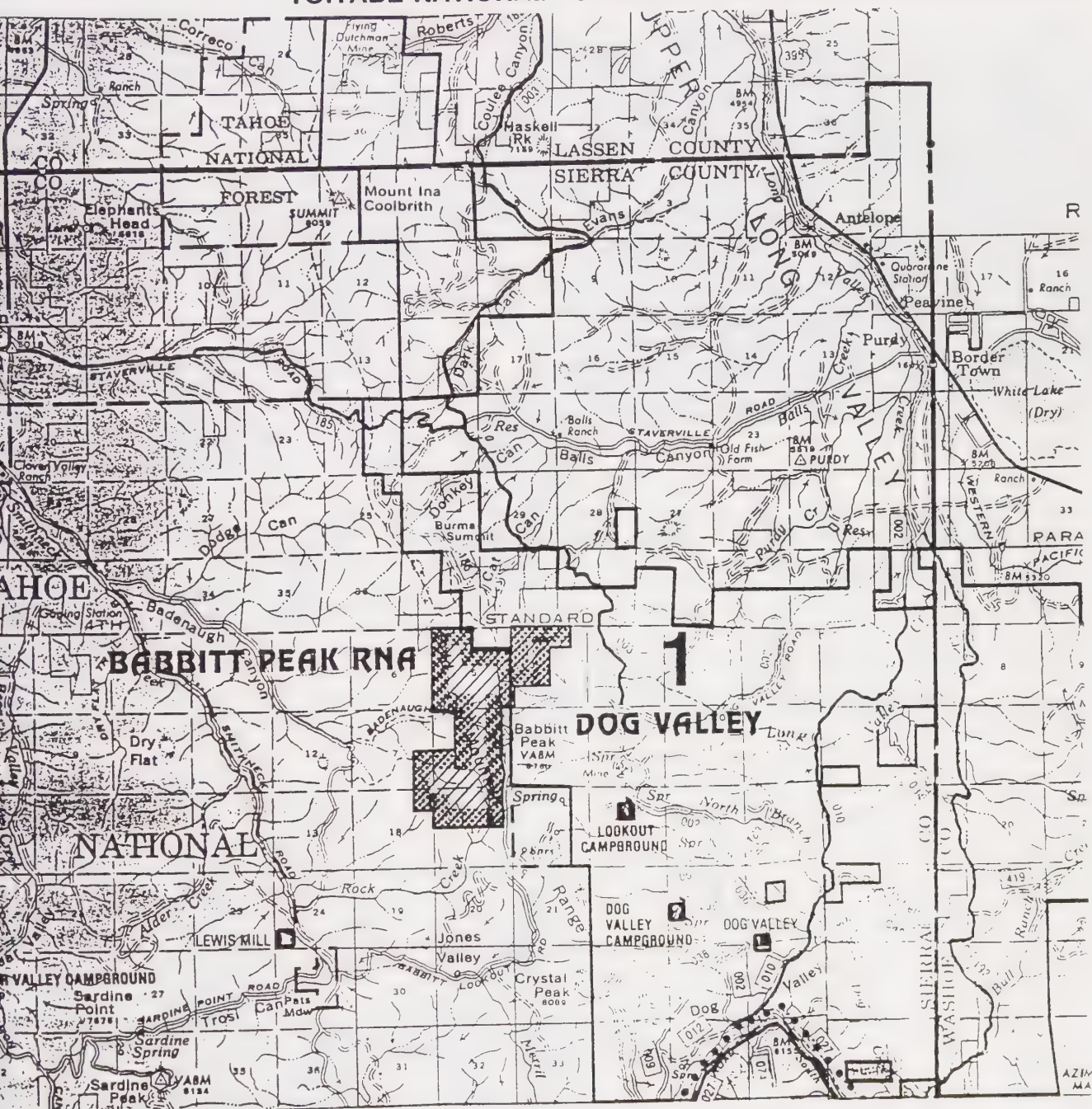










FIGURE 16-4  
TOIYABE NATIONAL FOREST VISUAL QUALITY OBJECTIVES



-  TOIYABE N.F.-  
UNCLASSIFIED
-  RESEARCH NATURAL AREA







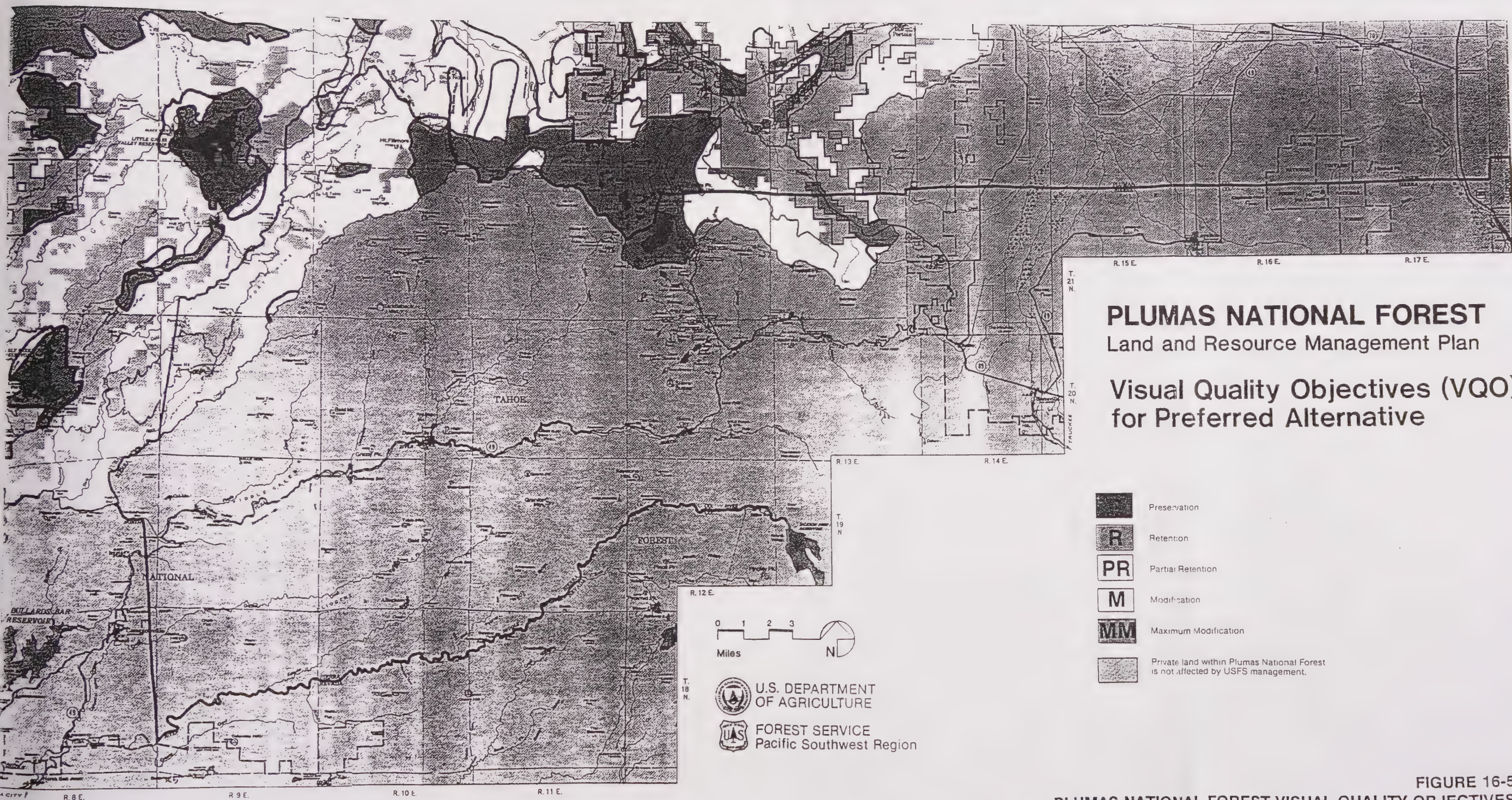


FIGURE 16-5  
PLUMAS NATIONAL FOREST VISUAL QUALITY OBJECTIVES







# **AIR QUALITY ELEMENT**



**GENERAL PLAN  
2012**









# **SIERRA COUNTY GENERAL P • L • A • N**

JULY, 1996

## **17. Air Quality Element Background Report**

### **Issues**

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The following issues were raised at the public General Plan Issues Workshops or at other points during the General Plan process by consultants, staff, or Planning Commissioners. While each of these issues may not have resulted in the development of a related policy (as a result of Planning Commission Discussion) the list is included here as a record of the full range of concerns discussed. Each of these issues are discussed in greater detail in the Background section.



**Table 17-1**  
**SIERRA COUNTY AIR QUALITY ISSUES**

General Plan Issues Workshops

Unpaved Roads	Logging roads that are unpaved create significant amounts of dust and particulate emissions.
Serpentine Rock	The Forest Service uses serpentine rock for road base which contains asbestos fibers.
Loyalton Air Quality	Particulate emissions from the Sierra Pacific Mill caused exceedances of standards in Loyalton.
Woodstoves Source	Use of firewood for home heating is causing air quality problems from the smoke.
Transport of Pollutants	A major portion of Sierra County's air pollution comes from the Sacramento Valley Air Basin.

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## Background Discussion

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### Introduction

Air quality is a public resource and like water resources must be protected. Sierra County currently suffers from air quality degradation caused primarily from transport of pollutants from urban centers to the west. However, locally generated pollutants can cause localized air quality problems at various locations within the County. The potential for localized air quality problems are discussed in the Existing Air Quality section of this Element.

### Setting

**Climate and Topography.** The topography of Sierra County is mountainous, with temperature extremes ranging from below zero to above 100 degrees (DWR, 1960). Average annual precipitation varies from greater than 70 inches in the lower elevations of the western part of the County to less than 15 inches in the high elevation basin in the eastern part of the County. There is a significant variation in rainfall across Sierra Valley in the eastern part of the County, with an average of more than 40 inches per year on the west dropping to less than 12 inches per year on the east (DWR, 1983). Average annual evaporation is about 41 inches at Downieville and 39 inches at Sierraville.



**Health Effects.** The health effects from exposure to air pollutant concentrations at or above State and Federal standards are described in the SACOG "Regional Air Quality Plan 1990" quoted below:

People living in the Sacramento region are exposed to significant health risks during periods when air pollutant concentrations are high. Air pollution affects everyone to some degree; however, pregnant women, young children, the elderly, and those with respiratory illnesses or cardiovascular disease are particularly susceptible to air pollution.

The two major air pollutants of concern, ozone and carbon monoxide, affect the body in different ways. Carbon monoxide, once inhaled, passes through the lungs directly into the blood stream. Here it interferes with the transfer of fresh oxygen, thus reducing the amount which reaches the heart, brain, and other body tissues. Exposure to carbon monoxide particularly endangers people with coronary heart disease, whose hearts already receive limited supplies of blood and oxygen. Even healthy people who are exposed to low levels of carbon monoxide can experience drowsiness, fatigue, nausea, headache, changes in heart function, impairment of vision and slowed reflexes. At very high concentrations, carbon monoxide can be lethal.

Ozone acts as a strong irritant that attacks the respiratory system. At high concentrations, it can cause severe damage to lung tissue. At lower concentrations, ozone decreases lung flow and increases resistance to air passage in lung tissue. Resulting symptoms range from coughs and chest discomfort to headaches and eye irritation. The human health effect of most concern is aggravation of chronic respiratory disease. Persons suffering from asthma, bronchitis and other respiratory ailments, as well as cardiovascular disease, are particularly susceptible to ozone. Other groups which are susceptible include children and persons engaged in heavy exercise. Nationwide, the EPA has estimated that approximately 44 million people are exposed to one-hour exceedances of the federal ozone standard on the average of nine times during the ozone season.

The length and frequency of exposure to ozone are important in determining health effects. Recent animal studies have indicated that prolonged exposure to ozone, even at concentrations below federal standards, can have adverse health effects, including increased incidence of bacterial and viral infections due to decrease in the lung's ability to resist infection. Animal studies have also demonstrated that prolonged ozone exposure can result in the premature aging of lung tissue, due to the repeated damage and subsequent scar tissue formation that occurs.

**Air Quality Standards.** The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards for six primary pollutants. The federal standards are divided into primary standards designed to protect public health and secondary standards designed to protect the public welfare.



**Table 17-2  
AMBIENT AIR QUALITY STANDARDS**

POLLUTANT	AVERAGING TIME	California Standards <sup>(1)</sup>	National Standards <sup>(2)</sup>	
		CONCENTRATION	PRIMARY <sup>(3,4)</sup>	SECONDARY <sup>(3,5)</sup>
Oxidant <sup>(7)</sup> Ozone	1 hour 1 hour	0.10 ppm -	0.12 ppm	Same as Primary
Carbon Monoxide	8 hour 1 hour	9.0 ppm 20 ppm	9 ppm 35 ppm	Same as Primary
Nitrogen Dioxide	Annual Average 1 hour	- 0.25 ppm	100 ug/m <sup>3</sup> -	Same as Primary
Sulfur Dioxide	Annual Average 24 hour 3 hour 1 hour	- 0.05 ppm 0.25 ppm	80 ug/m <sup>3</sup> 365 ug/m <sup>3</sup> -	- 1300 ug/m <sup>3</sup> -
Suspended Particulate Matter (PM <sub>10</sub> )	Annual Geometric Mean 24 hour	30 ug/m <sup>3</sup> 50 ug/m <sup>3</sup>	- -	- -
Suspended Particulate Matter	Annual Geometric Mean 24 hour	-	75 ug/m <sup>3</sup> 260 ug/m <sup>3</sup>	60 ug/m <sup>3</sup>
Sulfates	24 hour	25 ug/m <sup>3</sup>	-	-
Lead	30 Day Average Calendar Quarter	1.5 ug/m <sup>3</sup> -	1.5 ug/m <sup>3</sup>	Same as Primary
Hydrogen Sulfide	1 hour	0.03 ppm	-	
Vinyl Chloride (Chloroethene)	24 hour	0.010 ppm	-	
Visibility Reducing Particles	1 observation	Visibility <sup>(6)</sup> < 10 miles with relative humidity < 70%	-	
APPLICABLE ONLY IN THE LAKE TAHOE AIR BASIN:				
Carbon Monoxide	8 hour	6 ppm	-	
Visibility Reducing Particles	1 Observation	Visibility <sup>(6)</sup> < 30 miles with relative humidity < 70%	-	

SOURCE: Placer County Air Pollution Control Dist., December 1989



The chart on the previous page (Table 17-2) lists these standards. Pursuant to the Federal Clean Air Act, all areas of California have been classified as to their attainment status with regard to these national standards. In addition to these national standards the State of California Air Resources Board has also adopted ambient air quality standards. The State standards are also listed on Table 17-2 and either equal or exceed the concentration limits allowed according to the national standards.

**Monitoring Stations.** In reference to the Plan area, there are two upwind monitoring stations located in Nevada City (ozone) and Grass Valley (PM-10), and two monitoring sites located in the County in Downieville (ozone) and Loyalton (PM-10). Data from annual monitoring at these locations can be found in the "Existing Air Quality" section of this report.

**Existing Air Quality.** Pursuant to Federal and State Clean Air Act requirements, all areas in California have been classified by the ARB as to their attainment status with regard to the National and State Ambient Air Quality Standards. An air basin is the area designated for ozone, nitrogen dioxide, suspended particulate matter (PM-10), sulfates and visibility reducing particles. Therefore, if a violation occurs at any monitoring site for these pollutants in the air basin, the entire air basin would be classified as non-attainment.

For carbon monoxide, sulfur dioxide, lead (particulate) and hydrogen sulfide standards, a county or the portion of a county (such as a city) which is located within an air basin will be the area designated. However, if the ARB finds that there are areas within an air basin with distinctly different air quality deriving from sources and conditions not affecting the entire air basin, the State may designate an area smaller than an air basin using political boundary lines to the extent practical.

Air quality management in Sierra County is the primary responsibility of the Northern Sierra Air Quality Management District (AQMD). The AQMD is the local agency for air quality planning with authority over air pollution sources in Plumas, Sierra, and Nevada Counties. Sierra County is one of nine counties, or portions of nine counties that make up the Mountain Counties Air Basin (MCAB) (See Figure 17-1 for MCAB Boundaries).

The AQMD is responsible for monitoring and regulating emissions from stationary sources (i.e., Sierra Pacific Industries), area sources (residential fireplaces) and indirect sources (i.e., shopping centers). However, the AQMD can only regulate emission sources within the District and has no control over emissions emanating from sources outside the District. It should be noted

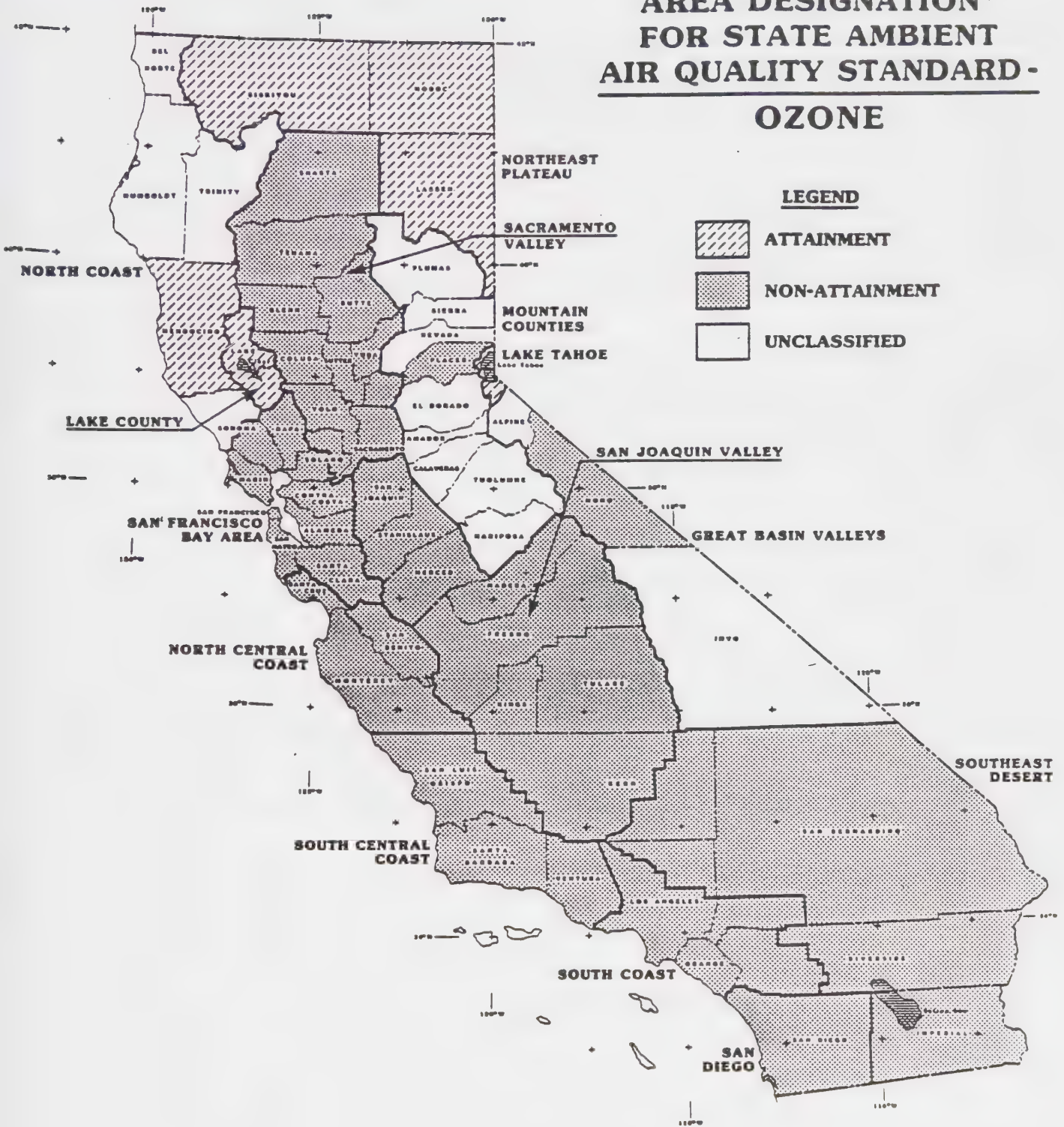


that the primary sources of emissions in Sierra County are related to forestry activities, agriculture, mining and residential fireplaces. Automobile emissions are not considered a major contributor to air quality degradation in the County due its small population.



FIGURE 17-1

# **AREA DESIGNATION\* FOR STATE AMBIENT AIR QUALITY STANDARD - OZONE**





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In general, Sierra County enjoys relatively clean air when compared to the more urban areas to the south and west. However, in regards to State and federal air quality standards, the County is currently classified as non-attainment for particulate standards (PM-10), and is classified as either attainment or unclassified for all other criteria pollutants. The data presented below indicates monitoring sites within the County and upwind of the County have recorded exceedances of both State and federal standards. It should be noted that violation of the PM-10 standard generally occur in winter months, due primarily to the use of residences heating with woodstoves. However, summertime violations have been recorded primarily during forest fires, agricultural burning, and controlled burns.

Representative ozone monitoring data is not yet available from the Downieville station due to the ozone season generally occurring between June and September. However, if exceedances are recorded this summer the violations are expected to be the result of ozone transport from urban areas to the west. Sierra County does not have a large enough vehicle inventory to cause ozone standards to be exceeded.

The following data table indicates past trends in air quality monitoring within the County (Loyalton) and at upwind monitoring sites outside the County.

<sup>2</sup>

**Table 17-3  
AIR QUALITY MONITORING TRENDS**

<b>Loyalton PM-10 Air Quality Data</b>				
<b>.....Mean Concentration (pphm).....</b>				
<b>Year</b>	<b>All</b>	<b>Peak</b>	<b>High</b>	<b>Days/Hours With Violations Federal Std.<sup>1</sup> State Std.<sup>2</sup></b>
	<b>Hours Sampled</b>	<b>Hour</b>	<b>(pphm)</b>	
1988	{Not available}			0 (0) 1 (11)
1989	"	"		0 (0) 2 (6)
1990	"	"		0 (0) 2 (12)
1991	"	"		
1992	"	"		

<b>Ozone Air Quality Data - Nevada City</b>			
<b>.....Annual Maximum Concentration .....</b>			
1989	0.12	0	12
1990	0.15	2	8
1991			
1992			

SOURCE: NSAQMD.



**Enforcement.** Responsibility for air quality involves a wide variety of agencies and groups at the federal, state, regional and local levels. Some of these agencies have actual regulatory authority, while others are responsible for the development and implementation of programs and procedures aimed at reducing air pollutant levels. The following is a list of some of the primary agencies responsible for regulating air quality and a brief description of their responsibilities as described in the SACOG "Regional Air Quality Plan 1990" quoted below:

The Environmental Protection Agency (EPA) is the lead federal agency and is responsible for setting the National Ambient Air Quality Standards and for establishing federal motor vehicle emission standards. The EPA also has the authority under the Clean Air Act to require preparation of state plans for air quality and may approve or disapprove state air quality plans.

The California Air Resources Board (ARB) is the lead state agency for air quality and is responsible for preparing and submitting a state air quality plan to EPA. In preparing a state plan, ARB reviews and approves regional air quality plans and then incorporates them into a State Implementation Plan (SIP).

With regard to mobile source control measures, ARB establishes emission standards for on-road motor vehicles sold in California. These standards are more stringent than the federal standards. With respect to stationary and area source control measures, ARB works closely with county air pollution control districts (APCDs) in the development of model stationary and area source rules for possible adoption by individual APCDs. In addition, the ARB works closely with the APCDs in controlling pollution from agricultural burning. Their primary role is to determine permissible burn days and to fund research toward alternatives to or reducing agricultural burning.

The Bureau of Automotive Repair (BAR), in the California Department of Commerce, is responsible for operation of the Motor Vehicle Inspection and Maintenance (I&M) program. This program, commonly known as the Smog check program, requires biennial inspection and testing of motor vehicle smog Control devices as a condition of vehicle re-registration.

The California Department of Transportation (Caltrans) is responsible, along with local cities and counties, for determining the feasibility and implementation of certain transportation control measures such as freeway ramp metering and high occupancy vehicle lanes. The Caltrans District 3 Rideshare Office also helps local jurisdictions, employers and individuals in establishing and expanding rideshare programs by matching commuters in car, van or bus pools; advertising rideshare services; making direct contact with employers; and identifying potential park-and-ride lots.



The Sacramento Area Council of Governments (SACOG) is the lead agency for the preparation of an update to the 1982 Air Quality Plan (AQP). SACOG cannot enforce compliance with the plan, but must rely upon air pollution control districts and cities and counties to adopt and implement recommended control measures. In addition, SACOG prepares an annual report on the progress made toward implementing the federal AQP, called the Air Quality Annual Progress Report. This report is submitted to ARB and EPA for review.

Air pollution control districts (APCD's) have the primary responsibility for preparation, adoption, and implementation of mobile, stationary, and area emission control measures. APCD's are special districts governed by the county supervisors. In addition, APCDs control agricultural burning based on ARB's determination of permissible burn days and by administering a burn permit system for local farmers.

Cities and counties may assume responsibility for implementing the transportation control measures (TCM's) recommended in the AQP update. If they assume that responsibility, a separate individualized set of control measures will be adopted by each jurisdiction and approved by the APCD, that reflects the type of mix of TCM's that are expected to achieve the greatest emissions reduction for each.

Since employers attract a predictable number of employee commute trips every workday, certain TCM's focus on employers, not government, for implementation. These include employer-sponsored rideshare programs and incentives, alternative work schedules, and on-site facilities such as showers, changing rooms and lockers for bicycle users. Success in reducing emissions ultimately lies with the individual, since individual lifestyle decisions regarding where to live and work, and what form of transportation to use greatly impact emissions.



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